
THE LIBRARY OF CONGRESS
1800

INVENTORS AND INVENTIONS

OF

CAYUGA COUNTY, N. Y.

CYRENUS WHEELER, JR.

THE

INVENTORS AND INVENTIONS

OF

CAYUGA COUNTY, N. Y.

BY

CYRENUS WHEELER, Jr.

WITH A SUPPLEMENT

BY DAVID M. OSBORNE.

Read before the Cayuga County Historical Society, at Auburn, N. Y., December 21, 1880, and forming a part of their publications, "No. 2."

ILLUSTRATED BY FRANK R. RATHBUN

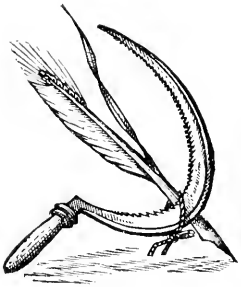
AUBURN, N. Y.
PUBLISHED BY THE AUTHOR.
1882.

AUTHOR'S EDITION, TWO HUNDRED COPIES.

NUMBER

KNAPP & PECK,
Book, Job and Commercial Printers,
AUBURN, N. Y.

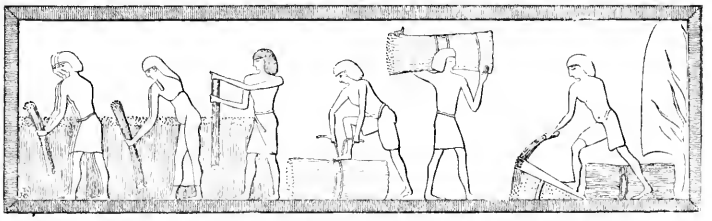
INDEX TO ILLUSTRATIONS.



THE INVENTORS AND INVENTIONS OF CAYUGA COUNTY, N. Y.

Read before the Cayuga County Historical Society, at Auburn, N. Y., December 21st, 1880.

BY CYRENUS WHEELER, JR.



Egyptian Flax Harvesting Scene.

INVENTORS AND INVENTIONS

OF CAYUGA COUNTY, N. Y.

THE subject of our paper this evening will be "The Inventors and Inventions of Cayuga County."

This County was originally included in Albany County, which was formed in 1683, and by subsequent statute was made to comprise everything within the Colony of New York, north and west of the present limits of that County, and all of Vermont. The County of Montgomery was formed from it, March 12, 1772, under the name of Tyron, borne by the then Colonial Governor. Its present name was given it in honor of General Richard Montgomery of Revolutionary fame. Herkimer

County, (originally called Ergheimer,) was formed from Montgomery, February 16, 1791, and Onondaga County from Herkimer, March 5, 1794. Onondaga County at this time comprised the whole military tract, and from this was taken Cayuga County, March 8, 1799, and Seneca County from Cayuga in 1804, and a part of Tompkins County in 1817, and Cortland County from Onondaga in 1808.

Fig. 1.—Costume and Accoutrements of Man in the Reindeer Epoch, Stone Age.

In treating the subject, we must ask the kind indulgence of our hearers whilst brief allusion is made to some of the earlier inventions of the country and the world.

George Farquhar, two hundred years ago truly said, "Necessity, is the mother of invention." This necessity has been acknowledged in all times and in every age, and among every people has been acted upon. Invention antedates the flood, and was at an early day practiced by our first parents. After partaking of the forbidden fruit, they felt the *necessity* of being clothed; "And they sewed fig leaves together, and made for themselves aprons," and thus became the *first inventors*, and *joint inventors* also, the record of which has been preserved in Genesis, third chapter and seventh verse. The question of dress from that day to this has been an important one, and

especially so in modern times to those fair daughters of Eve, who, with extensive wardrobes often feel in view of the rapid changes and wonderful inventions of fashion, that they "have nothing to wear."

Fig. 2.—Grecian Lady in Dress of Old Style.

The first necessity was food and clothing, the next shelter; and it is recorded in the fourth chapter and seventeenth verse of the same book, that "Enoch builded a City"; and in the twentieth verse, that Jabel "was the father of such as dwell in tents;" in the twenty-first verse, that his brother Jubal, "was the father of all such as handled the harp and organ;" and in the twenty second verse we learn that Tubal Cain "was an instructor of every artificer in brass and iron." Invention at that early day, appears to have made rapid progress.

The City built by Enoch, was probably a collection of tents, and the people mainly led a pastoral life, as "Jabel was the father of such as dwell in tents, and have much cattle." In Genesis, eleventh chapter, third verse, we learn that the descendants of Noah on the plains of Shinar, invented brick for building a city, and erecting a tower, neither of which appear to have

Fig. 3.—Costume of Rich Bourgeoise, 14th Century.

been completed. Invention had reached a high standard, and the arts and commerce flourished in past ages.

In regard to this country, and more especially this County, and the inventions practiced here at an early day, it is proper to inquire. This County, before its settlement by the whites, was the hunting ground of the Cayugas, a tribe of the Six

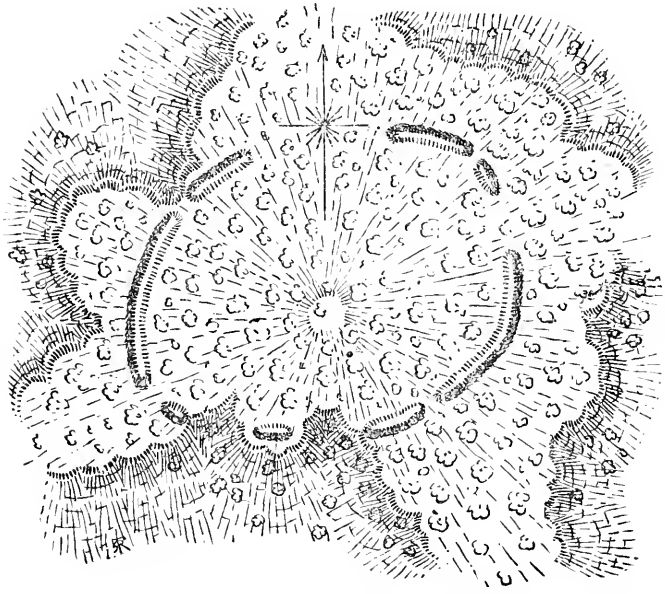


Fig. 4.—Plan of Ancient Work near Auburn, N. Y. (Fort Hill).—From Ancient Monuments of the United States. No. 1.—By E. G. Squier, Harpers' Magazine, May, 1880, p. 743.

Nations. Prior to their occupancy of it, another, and different race of people resided here. Agassiz has declared that, in his opinion, "America, so far as her physical history is concerned has been falsely denominated the 'New World.' Hers was the first dry land lifted out of the waters; hers, the first shore washed by the ocean that enveloped all the earth beside; and while Europe was represented only by

islands, rising here and there above the sea, America stretched an unbroken line of land, from Nova Scotia to the 'Far West.'" The characteristics of this early race, can only be judged of by the vestiges of their works yet in existence, as found widely scattered all over the country.

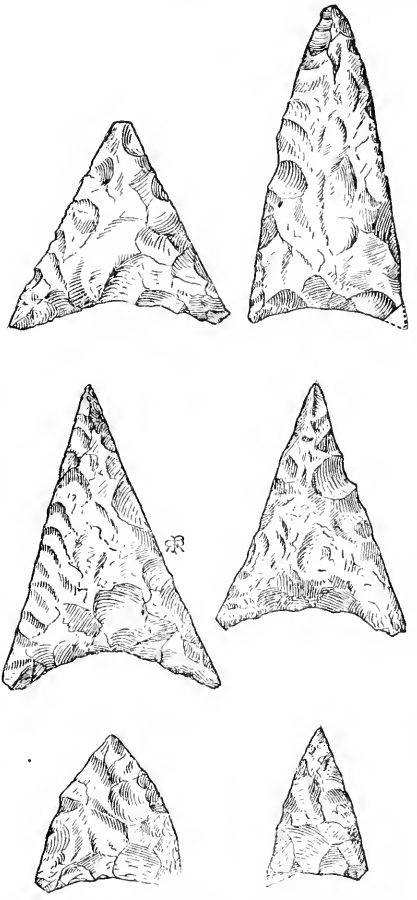


Fig. 5.—Six Arrow Heads of Flint—Cayuga Tribe—From Ancient Town on "Cutting Place," N. E. corner of City of Auburn, N. Y.

It has been inferred that this race was an agricultural people, dependent upon the soil rather than the chase for support. When, or how they disappeared, is veiled in uncertainty. It is, however, clear that many centuries must have elapsed since they occupied the country.

The aborigines of the country possessed in a moderate degree, inventive talent which was born of their first great necessities—food and clothing; secondly of the means for offence and defense; thirdly, transportation; and fourthly, of a desire for ornamentation. Its manifestation is shown in their implements of the chase and warfare, the bow and arrows and spears, the flint heads of

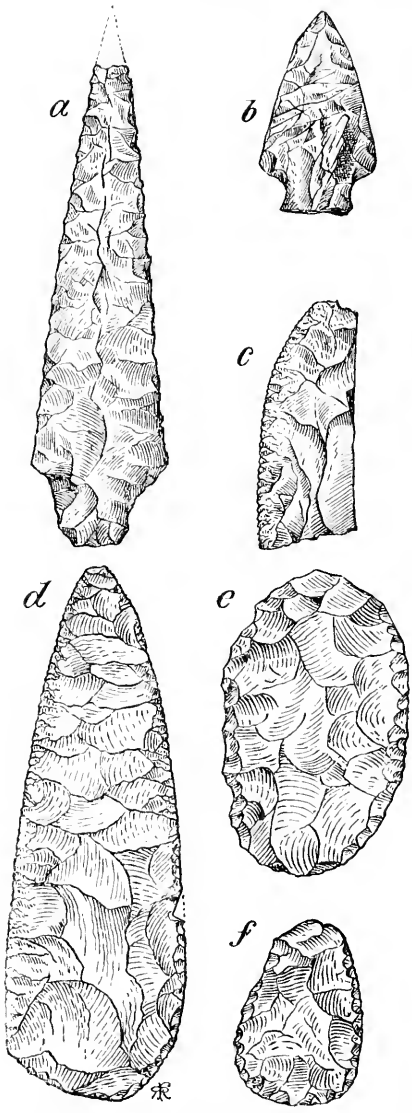


Fig. 6.—*a*, *b*, Flint Spear Heads; *c*, Knife; *d*, unknown; *e*, *f*, Celts or Scrapers. From farm of Ulysses Wright, Esq., on Franklin Street, Auburn, N. Y.

which, found in different localities, by their difference in form and finish, indicating difference of degree in the skill and inventive talent of the makers.

Their wigwams, their dress including their leggings and moccasins, attest their inventive talent and mechanical skill; and the light bark canoe, (Fig. 8.) as a means of transportation, not only evinces skill, but an adaptation of means to ends in harmony with their surroundings.

Rude pottery, as well as beads are found and attest the same faculty. When, or by whom these rude arts were first practiced, is uncertain; how long they had been practiced will remain forever unknown. They were, however, so practiced at the earliest date of which we have any authentic record of this country, which goes back to the early part of the seventeenth century.

The permanent settlement of this County by Europeans scarcely reaches back a century. The early pioneers, here found a nearly unbroken wilderness and with rare exceptions a heavy growth of timber, the product of a long undisturbed and prolific soil. To the removal of the forest they bent their energies. First in the order of their necessities, shelter was required. The straight bodies of the forest trees served the purpose, and the woodman's axe shaped them and from them the house was erected. Barks served as a covering; an open fireplace of stone, and a chimney laid up with sticks and mud; a splint plank floor,

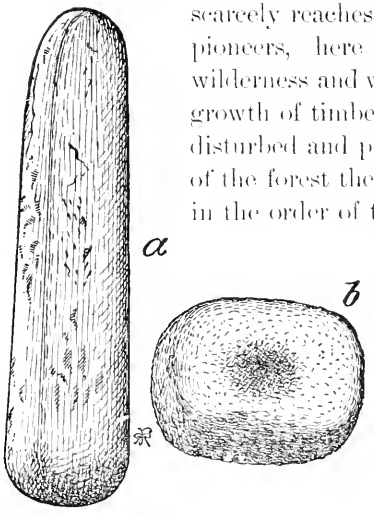


Fig. 7.—*a*. Stone Pestle from Cato, *b*. Hammer Stone from "Steel Place," Auburn, N. Y.

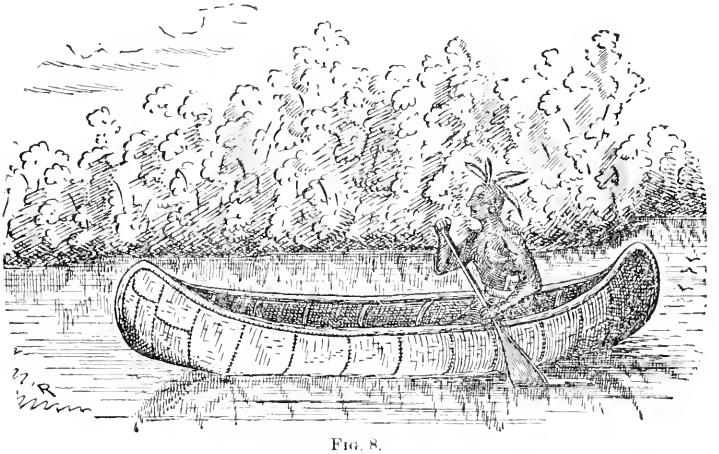


Fig. 8.

a door on wooden hinges and a "latch-string always out," completed the early home of the pioneer.

The furniture was scant and of the simplest kind. This home, however rude, was the centre of as much real happiness as more pretentious mansions often afford. As fast

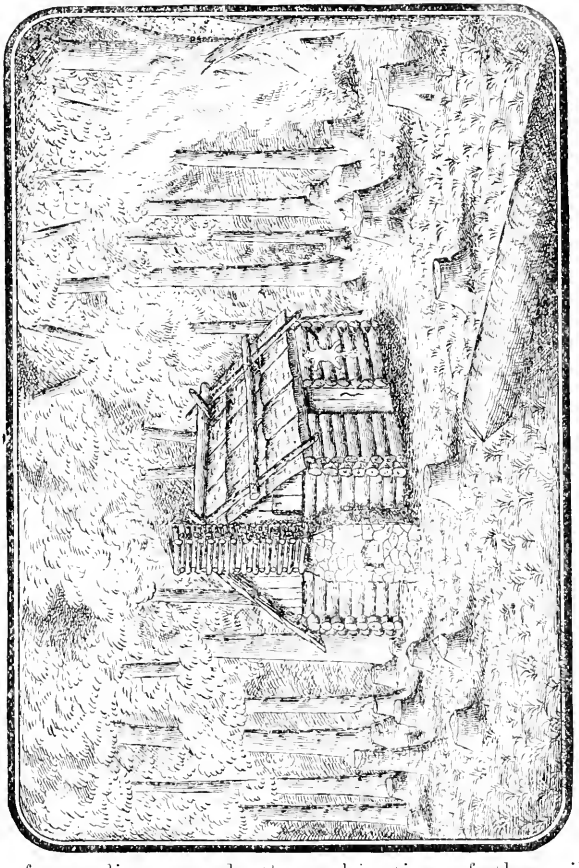


Fig. 9.—"Log Cabin" and "Clearing."

as the forest disappeared, the cultivation of the soil progressed. The implements in use were adapted to their necessities. The axe that cleft the timber, opened the ground for the reception of seed when thickly spread roots forbade the use of the hoe.

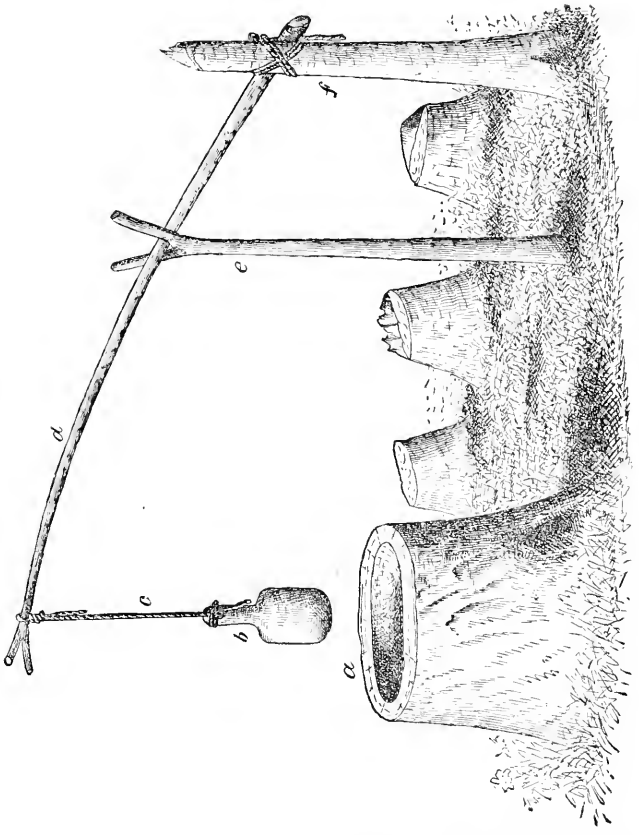


FIG. 10.—Samp Mortar of Early Settlers. *a*, Mortar; *b*, Pestle; *c*, Rope Carrying *b*; *d*, Spring-pole; *e*, Crotched Support for *d*; *f*, Tree to which end of *d* is lashed.

The crop of corn, when raised, was converted into samp and coarse meal by hand, aided by the stump of a tree

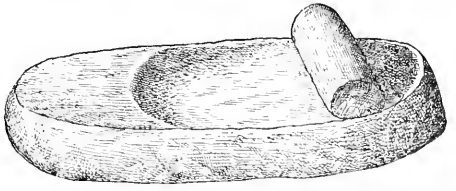


FIG. 11.—Primitive Corn Mill, Stone Age. (Figuier.)

hollowed out by the axe and fire to form a mortar, and a large wooden pestle suspended above it from a spring-pole.

The forest also yielded sweetness. The sugar maple, abundant in this County in those days yielded, in early

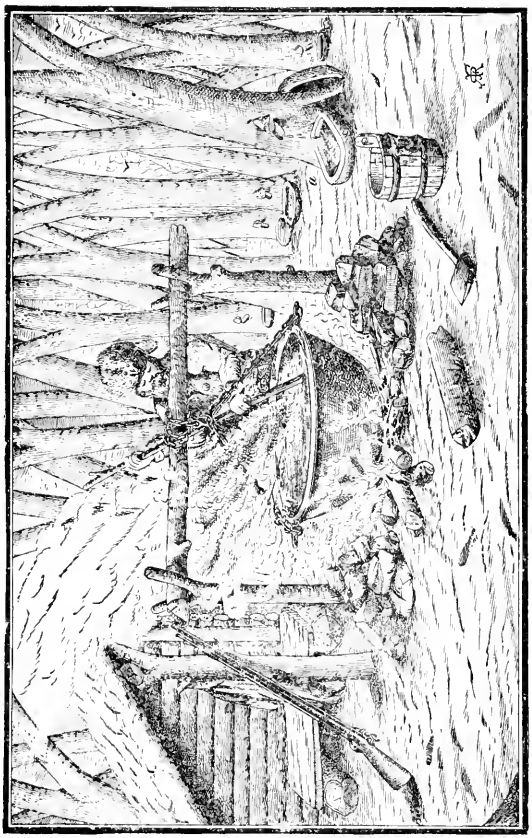


Fig. 12.—"Sugar Camp" of an Early Settler.

spring, an abundant harvest of sap, which was caught in troughs shaped by the axe, and boiled down to a delicious syrup making more palatable the corn meal cake, and the boiled samp.

With the advance of improvements, animals were introduced, and oxen became important aids in subduing the

FIG. 13.—"Log-boat," of Early Settlers.

wilderness and cultivating the soil. The implements and machinery in use were of the simplest kind; but of the kind best adapted to the necessities of the time. The first vehicles in use, were the "log boat," and the "log-sled." The first was formed of the crotch of a tree shaped by the axe, to slide over the ground. To this, the oxen, were attached by a chain, and it served much the same purpose as the stone-boat of the present day.

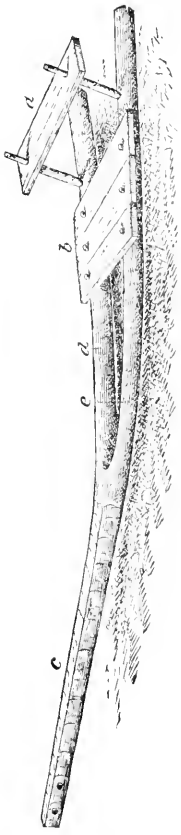


FIG. 14.—"Log-sled," of Early Settlers.

The log-sled was an improvement upon the log-boat, and served its special purposes. It was constructed in much the same form as the log boat, the forks of the triangle being left longer, and selected with a view to securing a long curved runner; and the main stem was hewn down, and left long enough to form a tongue, to which the oxen were attached. On top of the forked or runner part, was fastened a rough floor, and a raised bench for a seat.

This was the conveyance for long distances; it served to take the "grist to mill" (one of which, and we believe the first, was erected in what is now the city of Auburn, in 1794, and another in what

Fig. 15.—A Primitive Spinner. (Figuier.)

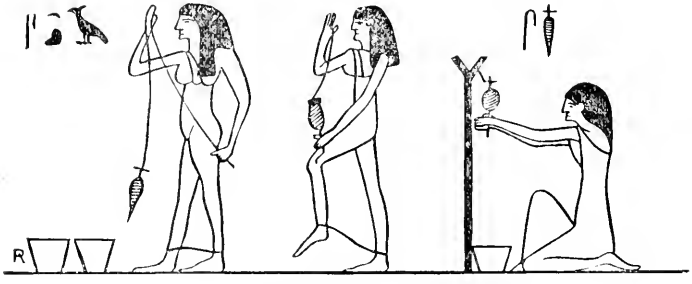


Fig. 16.—Egyptian Women using the Distaff.

is now Ludlowville, in 1798.) The County was then without roads, and fallen and decaying timber encumbered the ground, and this conveyance would ride over obstacles, which

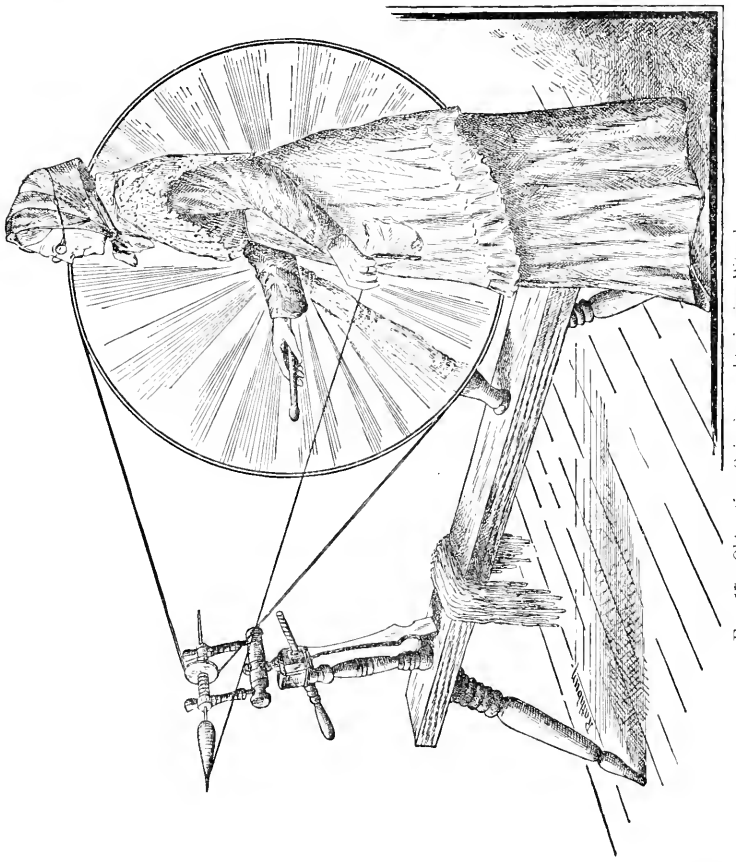


Fig. 17.—Olden-time Spinning and Spinning Wheel.

could not be safely surmounted by the log-boat or wheeled vehicles. In those early days, matron and maid availed themselves of this mode of conveyance to attend religious services and social gatherings. Whether this was more con-

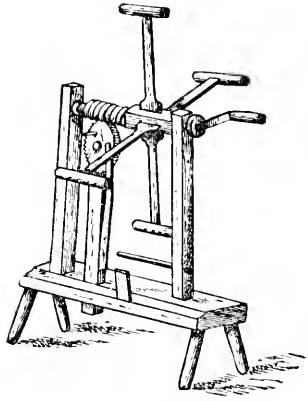


Fig. 18.—Reel of the Olden Time.

ducive to Christianity, or good digestion, we leave others to decide.

These and other improvements and inventions not named, were none of them covered by patents, and in fact antedate the patent laws of this country, and we admit that we cannot name with certainty, the particular persons to whom the credit of these inventions is due; although we can name some of the early pio-

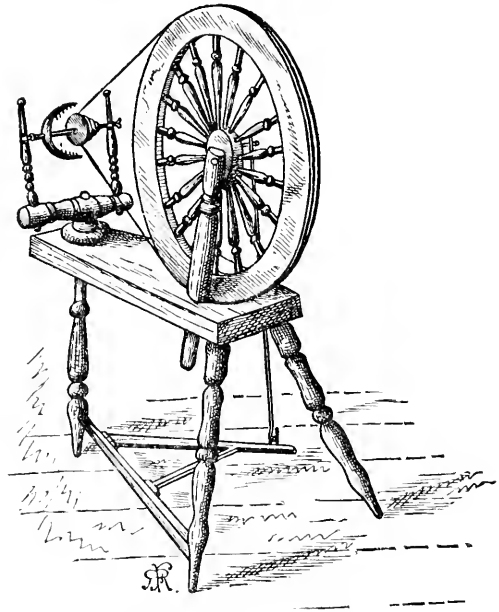


Fig. 19.—Spinning Wheel for Flax.

neers who practiced those arts with advantage to themselves and to the County.

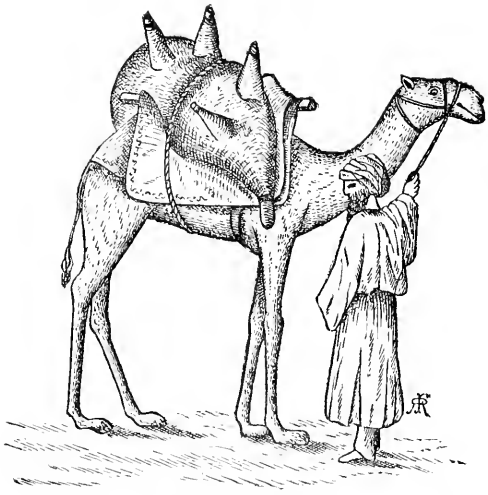


FIG. 20.—Eastern Mode of Churning in Skin Bottles.

FIG. 21.—Early Mode of Churning. The "Dash-Churn."

The first white settlers in the present limits of the County, were John Harris, from Harrisburgh, Pa., in 1778, who located at Cayuga, where he established the first ferry for crossing the lake. Roswell Franklin, from Wyoming, who located near Aurora in 1789, and Benjamin Avery, at Talleot's Corners, in the same year. In 1790, Elisha Durkee and Edward Paine settled near Aurora. Colonel John Hardenbergh settled in Auburn in 1793, and erected a grist mill in 1794, and the place was known as Hardenbergh's Corners until 1805, when it took its present name. Charles Kendall, Ezekiel Landon, and Akenson Tracy, were also early settlers in Scipio. These persons, or some of them at least, and many others not named, practiced such arts at an early day in Cayuga County.

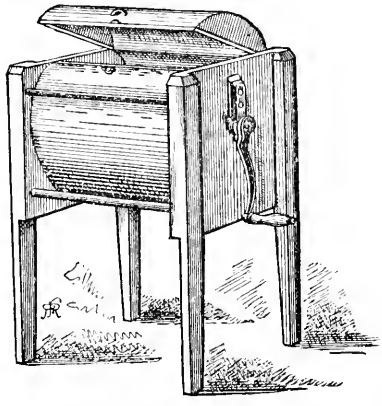


Fig. 22.—The Modern Rotary Churn, Blanchard type.

From 1793, onward to 1810, the County rapidly increased in population, as at that time, the census shows a population of 29,840. The industries of the County, too, were no less marked than its population. At that time, 1,360 looms were in operation, producing 340,870 yards of cloth. Eleven Carding Mills, eleven Clothing Mills, nineteen Tanneries, and forty-seven Distilleries, were also in operation. A writer about that date, says: "The inhabitants clothe themselves principally in the productions of their own families; and were it not for the exhorbitant number of their distilleries, I should add are very temperate and industrious."

Cayuga County, from 1810 up to the present time, has, we think, in its enterprise and industries, kept fully up to the necessities of the times, and will compare favorably with any other county or locality. Whilst Agriculture, Manufactures and Commerce are inseparable and mutually dependent on each other, it is not improper to inquire how much the success of all these is due to the skill of the inventor, stimulated and protected by the patent laws of the country.

The system of granting patents was not known to the ancients, and, in many countries does not at the present time exist. The system was not, as many suppose, an invention of some New England Yankee, though New England Yankees are many of them inventors; but from Old England we derived our patent laws, and like every thing else of English origin, we have improved upon them. In England the granting of patents was based on a statute passed in 1624, in the reign of James the First.

In France, the earliest patent law was in 1791. The patent system of the United States of America, has grown up under a positive grant in the Federal Constitution. The first act was passed in 1790. The law was amended in 1793, and the term was for fourteen years with a provision for extending the term of the patent, until the amendment of the law, July 3, 1832, and this merely indicated how the application to Congress for an extension should be made; the laws having from time to time been amended to the general law now in force relating to patents, which is that of 1870. By the act of 1836, patents were granted for fourteen years, and provision was made for an extension in certain cases for seven years more. In 1861, the original term was fixed at seventeen years, and extensions prohibited. Patents for designs may be taken out, for three and one-half, seven or fourteen years, as the applicant may elect.

The whole number of patents granted for inventions by the United States from 1790 to November 30, 1880, inclusive, is	235,059
For Designs,	12,049
For Trade-marks,	8,108
For Labels,	2,367
Making a total of,	257,583

Of this number, 474 were granted to residents of Cayuga County, for inventions; the earliest one being granted to Roswell Towsley of Scipio, for a plow, January 11, 1812, and the last one Oct. 26, 1880, to J. M. Hurd, and J. W. Mosher, of Auburn, for a washing machine. Of the patents granted, 68 were for harvesters; 11 for carriage axles and boxes; 12 for plows; 10 for harvester knife grinders; 9 for washing machines; 8 for clothes wringers; 8 for churns; 8 for threshing machines; and the balance distributed over a wide field embracing a large variety of subjects, including a cherry-stoner, carpet-stretcher, animal poke, stump extractor, life-boat, floating dock, dental engine, steam engine, match safe, and mill stone. Among the patentees are found ladies, physicians, dentists, lawyers, bakers and brewers, blacksmiths, silversmiths, machinists and manufacturers, mayors, ex-mayors and aldermen.

Of the earlier Inventors and Inventions, but little can with certainty be learned, as the destruction of the Patent Office and its records, by fire in 1836, cut off that source of information except in a few cases, where the specifications and drawings were afterwards restored. With the later Inventors and Inventions, much difficulty has been experienced in obtaining the necessary facts.

From 1790 to 1836, inclusive, forty-six patents were granted to residents of Cayuga County; of which, ten were for plows; eight for threshing machines; five for stave sawing and jointing; two for spinning wheels; three

for washing machines, and one each for a churn, harrow, mill-stone, mortising machine, hand rake, potash, pump, raising water, saddle, bedstead, fanning mill, fence wire, knife sharpener, furnace, shears, cordage, weavers' harness, and manufacturing brandy from domestic articles. From this, it will be seen that all the threshing machine patents, and all the plow patents except two, were granted prior to 1837. The earliest patent issued to a resident of what is now Cayuga County, was for a plow.

It will be impossible in the limited time, to more than briefly allude to a few of the four hundred and seventy-four inventors of Cayuga County; and notice of many of the inventions is necessarily omitted, from inability to obtain the required information.

Wm. H. Ward appears as an active inventor, covering a wide field which embraces car-brakes and car-couplings, bullet machinery, rotary steam engines, gear wheel, harvester rake, &c.

M. C. Cronk appears as another inventor. Ten patents were granted him on washing machines, clothes dryers, bottle-stoppers, bed bottoms, and so forth.

Jacob Brinkerhoff appears as an improver of corn shellers, clothes wringers, barbed fence wire, and fence posts.

S. W. and J. F. Palmer, are granted various patents on clothes wringers, clothes dryers, reels, and snow shovels.

Allen Sherwood secured patents for improvements in grain binders, mowing machines, corn-shellers, etc.

A. R Reynolds, patents for tempering steel and knife sections.

George W. Tripp, for dental chairs and dental engines.

George J. Letchworth and Byron C. Smith appear as inventors and patentees for improvements in hames.

John H. Osborne, as an improver of tables and steam heaters.

W. L. Bundy holds patents for his improvements in napkin hooks and sleeve buttons.

David Wright, from *legal defences*, has turned his attention to *farm fences* and fruit barrels, and holds patents therefor.

All of these inventions have merit, and many of them are undoubtedly important and useful.

Fig. 23.—Primitive Hoe of Wood, in Natural Form.

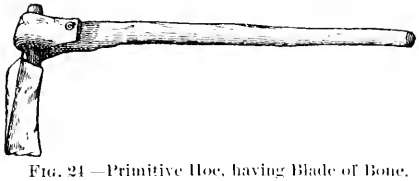


Fig. 24.—Primitive Hoe, having Blade of Bone.

Plows were of early origin. In the Old Testament, more than seven centuries before the Christian Era, in Isaiah, second chapter, and fourth verse, and in Micah, fourth chapter third verse, it is said, "They shall beat their swords into plow-shares." The plow of the ancient Egyptians, was of wood, a single crooked stick serving for the tail, and to this was fastened by a rope, a horizontal beam.

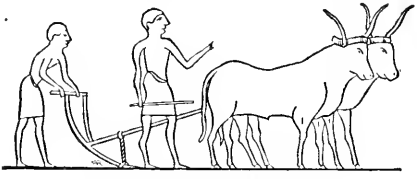


Fig. 25.—Egyptians Plowing.

The Greeks used a plow made from a tree having diverging branches, like the arms of an anchor.

These plows were probably shod with bronze or iron, as represented in Fig. 27.

Wooden plows, with wrought iron shares laid with steel and known as the "Bull Plow," were in use in this country within the memory of persons now living.

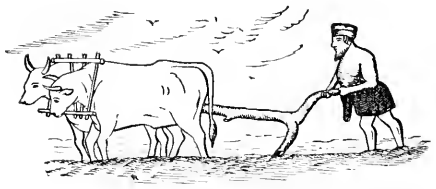


FIG. 26.—Plow of the Ancient Greeks.

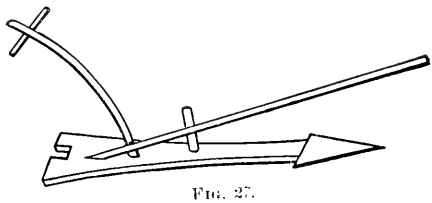


FIG. 27.

In the early part of the eighteenth century, plows were made in Holland, with mould-boards of wrought iron or steel, and some of these were introduced into England and Scotland about that time.

About 1784, James Small, of Berwickshire, Scotland, who wrote a treatise on plows, made cast iron mould-boards and wrought iron shares, and in 1785 made cast iron shares.

Charles Newbold, of New Jersey, obtained a patent June 26, 1797, for a plow. This is believed to have been the first cast iron plow made in the United States. The share was of wrought iron.

David Peacock, of Burlington, N. J., obtained a patent April 1, 1807. This had a cast iron mould-board, and a wrought iron share edged with steel.

FIRST PATENT GRANTED TO A RESIDENT OF CAYUGA COUNTY.

From the patent office records, it appears that Roswell

Towsley obtained the first patent granted to a resident of Cayuga County. This was for a plow, and was granted January 11, 1812. Mr. Towsley was a blacksmith by trade, and settled at Aurora, about 1806, previous to which, he resided at Manlius in Onondaga County. Where he was born and the date of his birth are uncertain. He built in 1817, at Aurora, the first steam flouring mill west of the Hudson. The building was of stone and is now standing on the dock west of Richard Morgan and Son's store, has long been, and is now used as a store house. It had four run of stone, manufactured excellent flour, and it was claimed when in operation, that it cost nothing for fuel, as the large quantity of wood burnt produced ashes enough to pay for the wood. It was in operation only about a year when Mr. Towsley failed and soon after became deranged. He was sent to the Lunatic Asylum in New York, where he died about 1820. He was an enterprising man, and carried on in addition to his flouring mill, a tannery, shoe shop, large blacksmith shop and a furnace.

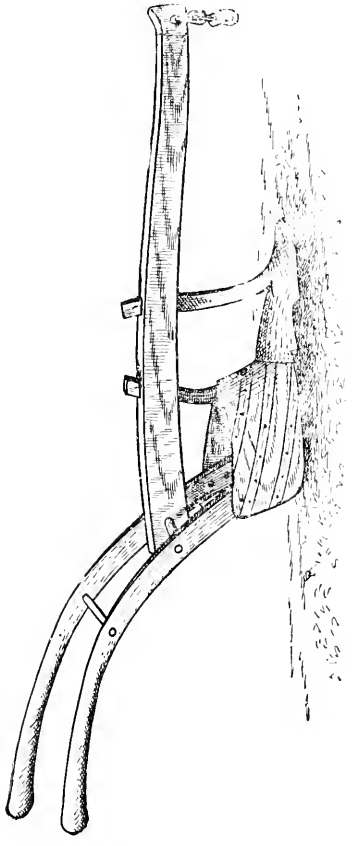


FIG. 28.—"Bull Plow."

The destruction of the patent office, with all its records, by fire in 1836, has deprived us of a knowledge of his invention from that source, and the lapse of time renders it impossible to ascertain with any degree of certainty the nature of the invention. As Towsley's invention, or at least his patent antedates that of Jethro Wood more than two years, and as he was running a furnace, it would be interesting to know the character of his invention.

Mathew Patrick, of Scipio, also obtained a patent on a plow, dated June 2, 1813. This antedates Wood's, more than a year. Of this invention nothing can be learned, and the name of the inventor is not within the recollection of the "oldest inhabitant."

Jonathan Swan, of Scipio, a *Friend*, was granted a patent July 5, 1814, and another April 24, 1824, for improvements in plows. He was a merchant as well as a natural mechanic. He was at one time in partnership with Wood and Towsley in the plow business; and, for a time, they worked together in the same shop. He came to Aurora about 1810, from western Oneida County, and was a very intelligent man; had a large family, many of whom became distinguished as jurists and in other positions. He died at Aurora and was buried in the Friends' Cemetery in the Quaker settlement.

Jedidiah Morgan, who with J. B. Harris, October 11, 1814, obtained a patent on a plow, was an enterprising farmer who settled at an early day a short distance south of Aurora, where he resided some time, but in later years, in Aurora, where he died in 1826. He was an energetic man, an influential politician of the Clintonian school, and a Senator at the time of his death. With no remarkable mechanical talents, he furnished the pecuniary means for Harris, who was a blacksmith by trade, not the most skillful of his calling, but a most worthy citizen.

R. Towsley, and Jonathan Swan, jointly obtained a patent

on a plow, which from its title apparently settles the question and decides the character of their preceding inventions. The records describe this last patent as a "Bull Plow." This kind of plow was well known, and the only one in general use prior to the introduction of the cast iron plow. The mould board was shaped from wood, and the edge and point or share, was of wrought iron faced with steel, and the mould board had thin strips of iron fastened to it to protect it from too rapid wear. (See Fig. 28.)

THE JETHRO WOOD CAST IRON PLOW.

To Jethro Wood, a resident of Cayuga County, the country is indebted for the "Cast Iron Plow," in general use at the present day. The inventor was born at White Creek, Washington County, N. Y., March 16, 1774, and died in the town of Ledyard, Cayuga County, N. Y., Sept. 18, 1834, in the sixty-first year of his age. He married at the age of nineteen, and seven years afterwards, in 1800, he moved with his little family to Scipio. His family occupied a log house, two and one-half miles south east of what is known as Poplar Ridge, until he could erect a log house and open a clearing on land located three-fourths of a mile west of Poplar Ridge which was given him by his father. When the house was ready he moved his family into it. In this they lived for years until his farm was cleared, when a frame house was erected on the same ground and continued to be occupied until his decease. The house is yet standing, and is owned and occupied by Wm. R. Hazard.

Mr. Wood's mechanical and inventive talent manifested itself at an early age. It is said when only five years old he commenced his experiments. He melted his mother's pewter spoons to cast a mould-board for a little plow, and cut the small buckles from his father's harness to complete one for the cat to draw the plow with. These early attempts were

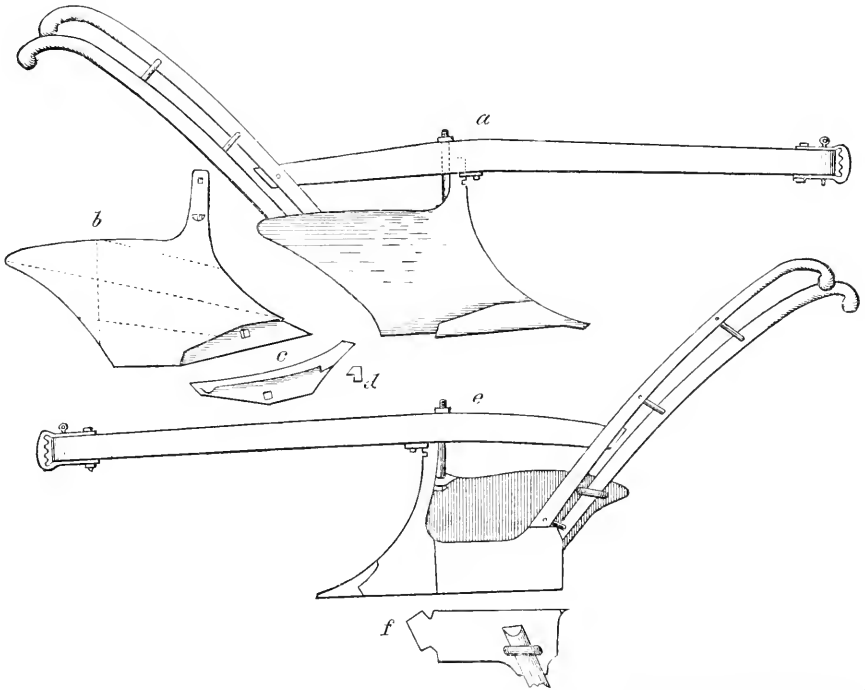


FIG. 29.—Jethro Wood's Cast Iron Plow; From copy of original from Vol. IV, of Restored Patents, now in possession of the Cayuga County Historical Society. *a*, Elevation of Mould-board side of Plow. *b*, Mould board; *c*, Reverse side of Share; *d*, Side view of Knob; *e*, Land-side Elevation of Plow; *f*, Inside view of Land-side.

suppressed, for a while at least, by the old fashioned whipping that followed, and no active efforts were made in that direction again until after marriage. At the time of his first settlement in this County, the condition of the country was such that plows were not a necessity under the then system of cultivation. Mr. Wood, long before the country was really in condition for the plow, began his experiments, and turnips and potatoes were shaped by his knife and hands into miniature plows, as models of form. He commenced active experiments in Scipio as early as 1812, and his first patent was obtained July 1, 1814, and his patent for the plow in its perfected form, September 1, 1819.

When or where his first plow was cast, is uncertain, as several localities claim the credit. One of Wood's plows, and it is believed by many to be the first, was cast under a tree standing at the time on the ground now occupied by the residence of David Raymond, at Poplar Ridge. The iron was melted in a broken potash kettle lined with clay. Charcoal was used for fuel, and an ordinary blacksmith's bellows furnished the blast. Mr. Wood and Mr. Asa Shourds, furnished the power. The patterns were made of wood by a carpenter and joiner residing in the vicinity, with the aid of Mr. Wood, who furnished a model made from a potato for the occasion. Afterwards he employed Joseph Ridgeway, a carpenter and builder who had failed in the business in New York, to aid him, and together they spent some six or eight months in experiments with the plow for the purpose of perfecting it. Mr. Ridgeway, subsequently engaged in the manufacture of the Wood plow at Columbus, Ohio, accumulated a fortune, returned to New York and paid his old creditors in full.

Mr. Wood found great difficulty at first in obtaining the proper kind, quality and mixture of iron, which was only determined by careful experiment. Mr. Wood also met

with great difficulty in introducing his plows among the farmers, and was often obliged to give plows away to introduce them. The prejudice against what was termed "Pot Metal Mould-boards" was universal. He traveled extensively himself, and sent agents to all parts of the country to bring the plow into use. In his early efforts, want of skill in the foundrymen often compelled him to mould his castings himself, as well as always furnish the patterns at his own cost, the foundrymen having no confidence in his success. Furnaces were few and small in those days. In his perfected plow, the mould-board was constructed and shaped on scientific principles, every inch of the surface being made to bear an equal pressure so as to wear alike, and in 1819, his perfected plow possessed all the important elements of the plow in use at the present day. That patent was extended by act of Congress in 1832, the only way that an extension could be obtained beyond the original term, which was fourteen years. Prior to the extension, defects in the patent laws prevented his enforcing his just claims against manufacturers who refused to pay. Then followed amendments to the patent laws, and expensive suits and trials for his children which consumed the extended term. Since this important and valuable invention has become without restriction open to the public, manufacturers and farmers not only appreciate, but acknowledge its value, which fairly estimated in dollars would reach the millions.

"Although previous attempts had been made to construct cast plows, Wood's was the first that proved entirely successful, and through the excellence of his invention and unwearied labors to perfect its manufacture and introduce it among the farmers, in connection with its cheapness and efficiency, he is justly regarded as the original inventor and successful introducer of the plow as now used by the farmers of the whole country; in the same way that to Fulton,

the inventor of the present form of the steam-boat, is due the credit of placing it successfully in use."

This is an imperfect history of an invention with which the name of Jethro Wood, of Cayuga County, N. Y., will for all time be inseparably connected. A man of whom our distinguished fellow citizen, the late Secretary Seward, has so justly said: "No person has benefitted his country pecuniarily more, and no man has been as inadequately rewarded."

I am enabled to present, through the courtesy of an unknown source, a few extracts from a little volume written by Mr. Frank Gilbert, entitled "Jethro Wood, Inventor of the Modern Plow." What I have already written concerning the early conception of a castiron plow by Mr. Wood, is confirmed by the work acknowledged, in which is also told the following curious episode, which the author thinks strikingly illustrative of the perversities of fortune to Mr. Wood, in the gloomy days when he was laboring to win appreciation for his valuable invention.

The author says: "It is a story of a Czar and a Citizen," and continues:

"All uncertainty as to the feasability of the new plow having been removed, and actuated by that broad philanthropy which was one of the peculiar charms in the character of Mr. Wood, he desired to extend as widely as possible the area of his usefulness, and concluded to make the Czar of Russia, so long the chief grain exporting country of the world, the present of one of his plows. During the Revolutionary war, then fresh in the American mind, that great sovereign, Catherine of Russia, had been the stanuch friend of this country, and that, too, without being impelled by jealousy of Great Britain. It seems to be a peculiar trait in the Romanoff family to admire liberty in the abstract, however absolute in practice. Sharing the prevailing good will toward Russia,

JETHRO WOOD.

(By the courtesy of Messrs. Rhodes & McClure, Chicago, publishers of "Jethro Wood, Inventor of the Modern Plow," 12 mo., p. 72, Chicago, 1882.)

Mr. Wood conceived this happy thought of making a truly substantial contribution to Cossack civilization, a civilization ever ready, with all its crudeness, to adopt foreign improvements. That gift, in one point of view slight, proved of great benefit to Russian Agriculture. It is impossible to state the extent of actual advantage derived by Russia from that truly imperial gift. It was in effect giving to that country, second only to the United States in area of tillage, in proportion to population, the free use of the perfected plow. In an old copy of the New York *Tribune*, in its palmy days of Horace Greeley and Solon Robinson, the tale of the Plow and the Ring is unfolded. It runs thus:"

"'During the year 1820, Jethro Wood sent one of his plows to Alexander I, Emperor of Russia, and the peculiar circumstances attending the gift and its reception formed a large part of the newspaper gossip of the day. Wood, though a man of cultivation, intellectually as well as agriculturally, was not familiar with French, which was then as now the diplomatic language. So he requested his personal friend, Dr. Samuel Mitchell, President of the New York Society of Natural History and Sciences, to write a letter in French to accompany the gift.'"

"'The Autocrat of all the Russias received the plow and letter, and sent back a diamond ring—which the newspapers declared to be worth from $7,000 to $15,000—in token of his appreciation By some indirection, the ring was not delivered to the donor of the plow, but to the writer of the letter, and Dr. Mitchell instantly appropriated it to his own use. Wood appealed to the Russian Minister at Washington for redress. The Minister sent to his Emperor and asked to whom the ring belonged, and Alexander replied that it was intended for the inventor of the plow. Armed with this authority, Wood again demanded the ring of Mitchell. But there were no steamships or telegraphs in those days, and

Mitchell declared that in the long interval in which they had been waiting to hear from Russia, he had given it to the cause of the Greeks, who were then rising to throw off the yoke of their Turkish oppressors. A newspaper of that time calls Mitchell's course 'an ingenious mode of quartering on the enemy,' and the inventor's friends seem to have believed that the ring had been sold for his benefit. At all events it never came to light again, and Wood, a peaceful man, a Quaker by profession, did not push the matter further.'"

"Perhaps another and quite as potent a reason why Friend Wood did not follow up this matter was that weightier affairs demanded his immediate and entire attention. One difficulty was overcome only to develop another. No sooner had he silenced the cavils of the farmers and demonstrated the value of his patent, than infringements upon his rights threatened to, and actually did, rob him of the fruits of his invention." * * * * * *

"Not even the cruel wrongs he sustained at the hands of dishonest infringers could turn the sweetness of his kindly temper. Nature had endowed him richly every way, and no gift had been abused. Physically, his was the highest type of manly beauty. Six feet and two inches in height, perfect in proportion, courtly in manner, his presence was worthy his character."

The subsequent labors of Benjamin Wood, the son of Jethro Wood, who received the invention of his father as a legacy, were full of zeal, energy, trials, disappointments and untiring labor, which finally resulted in an unequivocal decision by the Circuit Court at Albany, after a three days' trial, that the plow then in general use all over the country was unlike any other, and that the improvements which rendered it so effective were due solely to Jethro Wood, and that all manufacturers must pay his heirs for the privilege of making it. Although this triumph was great, the patent

had little more than a year to run, and while Benjamin Wood was exerting his efforts with a fair degree of success, for its extension, he suddenly fell dead, while conversing with one of his friends, of heart disease, and the patent expired without renewal.

On settling the affairs of the estate, it was found that less than five hundred and fifty dollars had ever been received from this important invention.

Subsequent efforts by the remaining heirs, consisting of four daughters, to obtain provision and protection, in whose interests the exclusive right of making and vending the improvements of the plow should rest for seven years, were made, and a bill providing that twenty-five cents on each plow made might be exacted, passed the Senate unanimously. In the House, the bill was killed by the money of the plow manufacturers, who then swarmed in Washington, and the two younger of the Quaker sisters who had been most active in the matter retired defeated, and we may add defrauded. The very documents which had been used in their suit and which some friendly (?) members of Congress advised them to deposit in Washington, mysteriously disappeared; nor from that time to this have they been seen or heard of; and thus has perished the last vestige of proof of their father's inventive and incomparably beneficial genius.

Avery Babbitt, another inventor of Cayuga County, was born in Bennington, Vermont, September 1, 1806. Died at Slaterville, in Tompkins County, September 12, 1872. He learned the carpenter and joiner trade, and followed the business until 1843. For some time prior to his removal to Auburn, which was in 1838, he resided in Locke, in this County.

In 1847, Mr. Babbitt superintended the construction of the first carpet looms for use in Barber's Carpet Factory. He obtained his first patent on looms, October 8, 1850, and

subsequently other patents were granted him for improvements on bolt-cutters, prismatic lathes, loop machines, etc. Looms were manufactured by himself, and under the firm name of Babbitt & Hickey, quite extensively, and are now in use not only in Auburn, but in Philadelphia and other places. He was original in his conceptions and undertakings, one of the best mechanics in the County, fixed in purpose, energetic and persistent in whatever he undertook, and he filled with great credit, if not with profit to himself, an important place in the mechanical and industrial progress of this County.

The name of Calvin Young, another inventor of Cayuga County, appears on the records of the patent office. He was born in Auburn, June 31, 1830. A natural mechanic, his tastes in that direction were manifested at an early age. When but fourteen years of age, he constructed a fire engine which did excellent service in extinguishing a fire which occurred in Court Street, before the somewhat tardy "City Firemen" of that day, reached the ground with their apparatus.

In early life, through the kindness of the late Cyrus C. Dennis, he was afforded opportunities in the machine shops carried on in the prison under the superintendence of Wm. H. Hudson, one of the best mechanics of that day, from whose instructions he derived great benefit in after life. These opportunities were further improved upon under Mr. Avery Babbitt when constructing the first carpet looms for Barber's Carpet Factory. Subsequently, he was employed in Brooklyn and Buffalo, in building tools and machinery for manufacturing saddlery and harness hardware. He was also employed for a time, in the Auburn and Syracuse Rail Road shops. In 1850, he entered into partnership with O. H. Burdick, in building straw cutters, and subsequently engaged with Beardsley, Keeler and Curtis, as assistant fore-

man, and continued in that position until the expiration of their prison contract, about three years, when John Curtis obtained the contract and was succeeded by Sheldon & Co., Mr. Young continuing as foreman through all the changes. As foreman for Sheldon & Co., in 1858, he superintended the construction of the first Wheeler machines manufactured in the prison, and from that time to the present has been intimately connected with their manufacture.

His first patented invention was a bullet machine, the main features of which were appropriated by others, and from which, by reason of a defect in his patent, he received no remuneration. He also obtained two patents on machines for upsetting and forming the collars on carriage axles. From these he derived pecuniary advantage. A patent was also obtained on self-rake improvements.

A firm unwavering friend and estimable citizen, with opinions of his own, which once deliberately formed are not easily changed, he does not hesitate to express in plain words and at times with much force, his convictions. His life has been a successful one, due wholly to his own efforts and industry.

Charles W. Miles, another Cayuga County inventor, made improvements in carpet looms for which he received a patent. The improvement related to the shuttle-box and the shading of the figures in carpets. The improvement is in use in this city, Philadelphia and other places. He also learned his trade with Avery Babbitt, in this city. He was born in Sennett, Cayuga County, October 18, 1826. For eleven years he was engaged in the construction of carpet looms. From 1864 to 1867 he was engaged with Avery Babbitt in the manufacture of piano stools, since which time he has been employed as foreman in the Cayuga Chief, and D. M. Osborne & Co.'s Reaper Factory. Mr. Miles is another self-made man, a good mechanic, and an estimable citizen.

Frederick Van Patten, another inventor of Cayuga County, was born in the town of Victory, September 22, 1836. At the age of sixteen he became an apprentice to the machinist's trade, and at the end of three years found employment in Colt's Armory, at Hartford, Conn. Here he remained until 1861, when he accepted a position in the Fire Arms Manufactory of the Remingtons at Ilion, N. Y. In 1864, he came to Auburn, and engaged in the mechanical supervision of the manufacture of the E. D. Clapp patent thill coupling, which was manufactured in a small way in a part of the City Mills on Mechanic Street. To thill couplings, fifth wheels were not long after added. More room was required as the business increased, and in 1869 a large building was erected on Water Street for the purpose. The line of goods manufactured, increased, and in 1874 a large factory was erected on Genesee Street, corner of Division. A stock company was formed in 1876, and the business has increased from year to year, and to-day this company furnish complete sets of forged irons for carriages, which, for top-buggies, requires over one hundred pieces of hardware.

Numerous patents have from time to time been granted to Mr. Van Patten for improvements in the dies used in the drop presses of the establishment for shaping with exactness and facility the many different pieces embraced in carriages as constructed at the present time. He has also, more recently, been granted a patent in conjunction with E. D. Clapp, on a machine for rolling the iron for making carriage clips.

E. D. Clapp, Esq., a natural mechanic and practical carriage maker as well as a practical business man, whose name is inseparably connected with the foregoing enterprise, and to whom in a great measure the magnitude and success of the business is due, is also an inventor; and to his first invention, an improved thill coupling, is due the first establish-

ment of this business; a business which has grown to such astonishing magnitude in so brief a space of time, and which to-day is furnishing to carriage makers throughout the country a superior class of carriage hardware, and to three hundred of the citizens of Auburn constant employment.

Mr. Clapp was born in the town of Ira, Cayuga County N. Y., November 13, 1828. For the last twenty-five years he has been a resident of the city of Auburn. He learned the carriage maker's trade in Ira, and carried it on successfully there, for a time, before moving to Auburn, and he is now preparing, in connection with others, to renew the business on a more extensive scale than was ever dreamed of in the earlier days of carriage making.

W. W. Crane, a Cayuga County inventor, though born in London, England, October 27, 1820, and learning the machinist's trade there, has resided here for nearly thirty years. He first came to this country in 1848; remained but a short time and returned to England, and again, in 1851, returned to this country where he has since resided. He has obtained nine patents, one of which was for an invention of Mrs. Crane and himself which was taken out by them jointly, it being for a "Self-lubricating Box for Car Axles."

His first patent was granted in 1857, on a machine for polishing morocco leather. His subsequent patents were for steam boilers and steam engines, couplings, hangers and self-lubricating boxes for shafts, and self-lubricating pulleys. Some of these improvements are in extensive use. The self-lubricating box and hanger are manufactured in New York City, and at Woonsocket Falls, R. I., by different parties, to the extent of $10,000 monthly. For six years past Mr. Crane has carried on a foundry and machine shop on Water Street, Auburn, employing at the present time, twenty-eight men on general job work and repairs. Mr. Crane is a good mechanic and a worthy citizen.

Isaac Stark and Lyman Perrigo are inventors of valuable improvements in spoke machines. Their patent was obtained June 13, 1854, and from that time to the present, machines have been made by Perrigo & Co., of Groton, Tompkins County, N. Y., and the machines are now in use in fifteen different states of the Union. Lyman Perrigo was born in the town of Venice, Cayuga County, November 14, 1821, and died in Groton, Tompkins Co., October 15, 1870. He was a machinist by trade, a good mechanic, and aimed to excel in his chosen field, and every machine and implement that passed through his hands bore the impress of his mechanical skill and inventive talent.

Isaac Stark, the co-inventor with Perrigo, died in Genoa, Cayuga County, where he resided for a long time previous. He was a carpenter by trade, and at one time carried on the manufacture of grain cradles and hand hay rakes at that place quite extensively. He was a superior mechanic. The beauty and finish of his handiwork, was proverbial. In the days of harvesting by hand, the man who was able to obtain a Stark cradle felt that he had the best implement of the kind in existence, and with a good binder behind him with a Stark rake, it was expected that a little more work would be accomplished than could be done by any other combination of hand tools then in existence.

Elliott G. Storke, in 1867, established the manufacture of iron bench and block planes, which he conducted up to his decease. He, as an inventor, has been granted several patents for improvements in that class of tools. He was born in Aurelius, in this County, June 18, 1811, and died in Auburn, Sept. 11, 1879.

Mr. Storke received a limited common school, and partial academic education, which was further improved upon by a careful study of books without the aid of teachers. At the age of sixteen he engaged in teaching school. In 1842 he

was appointed County Superintendent of the public schools of this County. He next engaged in book publishing. Financial embarrassment in 1856, followed by the panic of 1857, forced the firm with which he was connected, into liquidation. During the Rebellion, he accumulated material for its history, which he published. In 1866, with others, he was engaged in organizing the Merchants' Union Express Company.

Mr. Storke was an enterprising man, who, through a long and active business life retained the esteem of his fellow citizens.

C. B. Hutchinson, a successful inventor of Cayuga County, resided in Auburn, corner of Grover and South Streets, at the time of his death, which took place September 12, 1869.

Mr. Hutchinson was born in Marion, Wayne County, N. Y., September 17, 1818. He learned the machinist's trade, and came to Auburn in 1854. Was a natural mechanic and inventor, and his inventions exhibited remarkable skill and adaptation of means to ends. His inventions mainly pertained to barrel machinery from which he derived considerable advantage, but the public much greater. He also made improvements in cider mills and grape presses, which have been extensively manufactured and used, and continue to be so manufactured and used. He received the sum of $20,000.00 for the patent on his cider and grape mill and press.

Charles F. Davis, inventor, has been granted a patent on a harvester rake, and also on a grain drill. His improvement on grain drills consists in an application of devices by which the operator can change the drill teeth from single to double rank, or from a straight line to a zig-zag line, and *vice versa*, by a single movement of a lever. This invention is one of much value, and is now in general use, and from it he has derived considerable pecuniary advantage. Mr. Davis

is now a resident of Auburn, and was born in the town of Aurelius, Cayuga Co., August 10, 1845. He farmed it for a number of years in Aurelius, on the farm on which he was born; never learned any mechanical trade, but is a natural mechanic; can handle tools skillfully, and generally makes his own models and experimental machinery; is a very worthy man and a good citizen.

INVENTORS IN HARVESTING MACHINERY.

FIG. 31.—Sickle of the Bronze Epoch, found by M. Desor, at Chevroux. (From Figuier's "Primitive Man.")

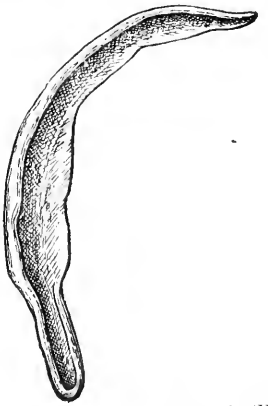


FIG. 32.—Sickle of the Iron Epoch. (From Figuier's "Primitive Man.")

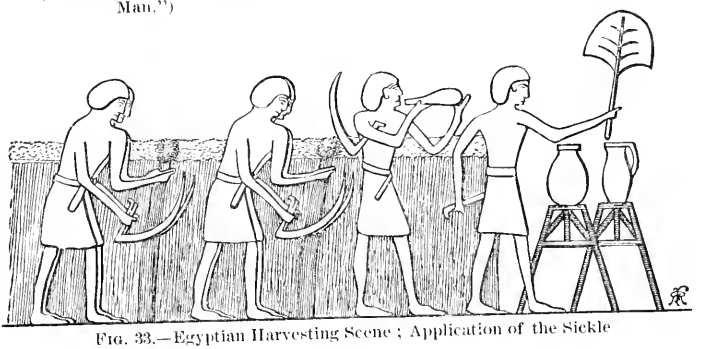


FIG. 33.—Egyptian Harvesting Scene; Application of the Sickle

In harvesting grain, the sickle was probably the earliest instrument in use. It is mentioned in Deuteronomy, six-

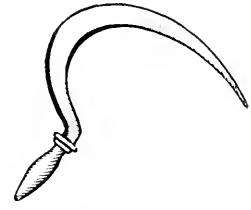


Fig. 34.—Sickle of the Moderns.

Fig. 35.—"The Reaper," (after Millett.) Application of the Sickle.

Fig. 36.—The "*Ani-ani*," or Reaping Implement of Java. *a*, Hand-piece; *b*, Long Spatula, shaped left-hand piece.

teenth chapter, ninth verse, and again in the twenty-third chapter, twenty-fifth verse. This dates it back for three thousand years.

In Java, an instrument known as the "*Ani-ani*," and costing about three pence, is used for gathering or reaping

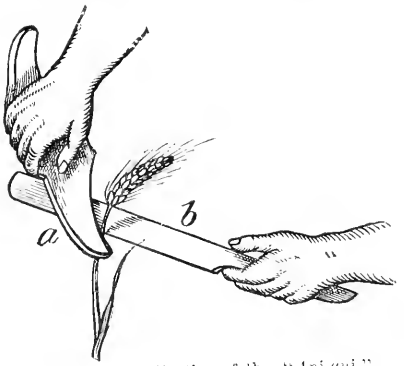


Fig. 37.—Application of the "*Ani-ani*."

grain. This instrument is held by the reaper in a peculiar manner, and with it he crops off each separate ear with a few inches of the straw. This method of reaping has been

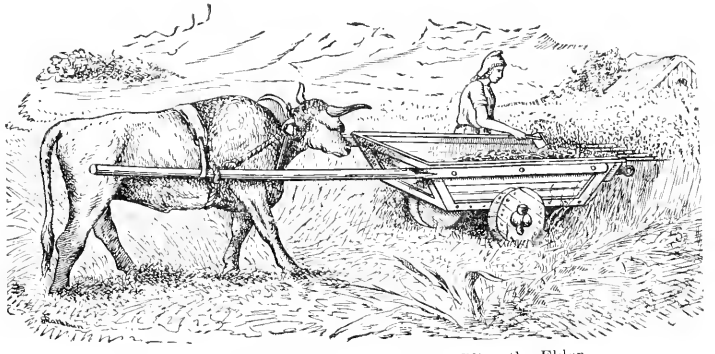


Fig. 38.—Reaping Machine described by Pliny the Elder.

immemorially practiced in that country and is universally followed.

It has been conjectured that the reaper using the "*Ani-ani*" takes one of the two parts of the implement, (*a*), in the right hand, and the other part, (*b*), in the left; and that in

passing them over each other like the blades of shears, the straw between them is cut and together with the head of grain, falls into an apron or basket worn by the reaper.

The first mention of a machine for reaping grain, is given by Pliny the Elder, early in the first century, who describes it as a van or cart of large size, with projecting teeth on the edge, which was driven through the standing corn by an ox yoked in the reverse direction, and used at that time in the extensive fields of the lowlands of Gaul, and which served to gather the crop by stripping off the heads.

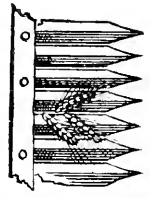


Fig. 39.—Enlarged Section of Stripping Teeth of Harvesting Machine described by Pliny the Elder, First Century.

The use of this machine is believed to have continued through centuries, as Palladius, (an Eastern Prelate and Ecclesiastical writer), early in the fifth century describes the same machine. When it went out of use is unknown.

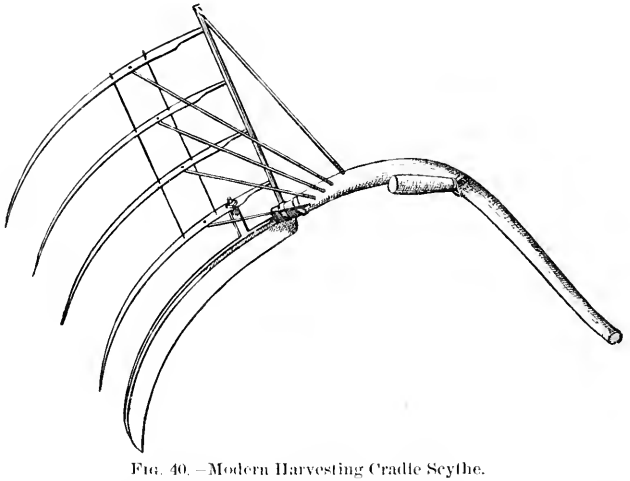


Fig. 40.—Modern Harvesting Cradle Scythe.

The first patent granted for a reaping machine, was in England, July 4th, 1799, to Joseph Boyce. This machine

FIG. 41.—Application of the Harvesting Cradle Scythe.

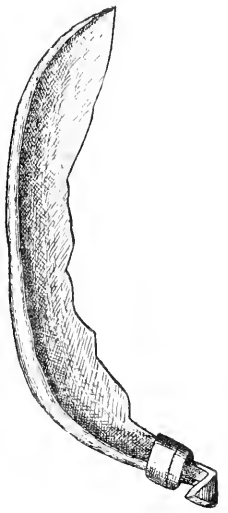


FIG. 42.—Scythe of the Iron Epoch, from the Lacustrine Settlements of Switzerland, (Figuier's "Primitive Man.")

FIG. 43.—Application of the Scythe; Laboring Colons, (12th Century,) after a Miniature in a Manuscript of the *Ste Chapelle*, of the National Library of Paris. Lacroix. "Bibliophile Jacob."

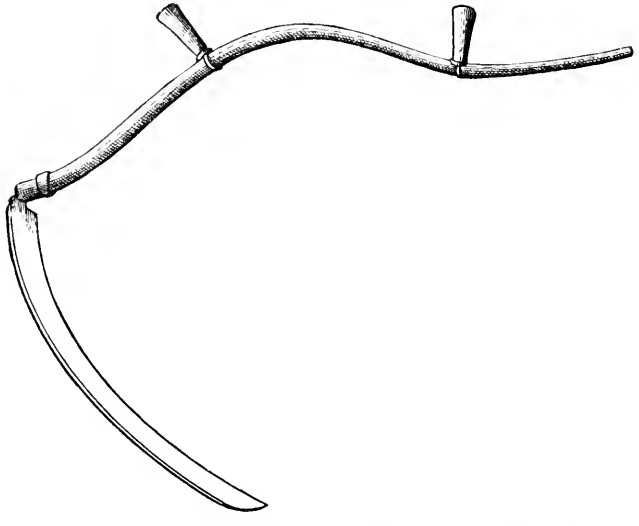


FIG. 44.—Scythe of Modern Times; Used for Mowing Grass.

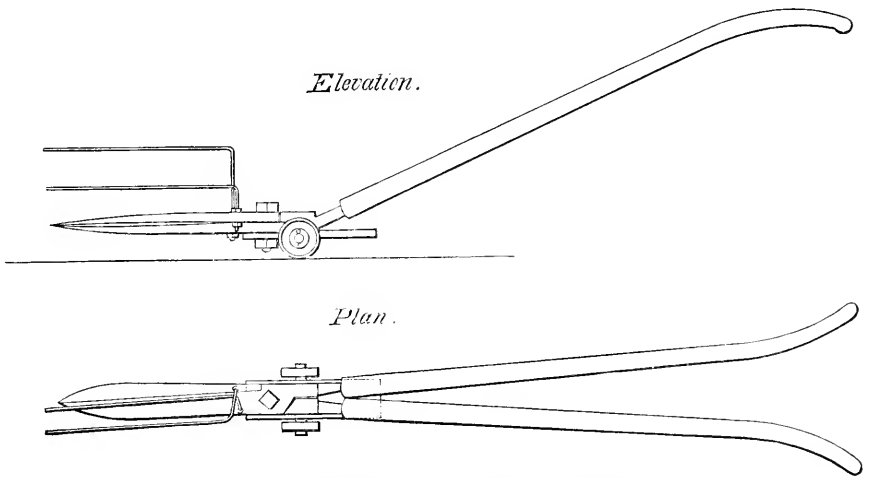


Fig. 45.—Drawing as Suggested from the Description in Meare's Specification.

had a series of knives or cutters affixed to the lower end of a vertical spindle, which was arranged on wheels, and caused to revolve against the grain by being pushed forward from behind. In the following year, Letters Patent were granted for a mechanical reaper to Robert Meares, of Frome, Somersetshire, on the twentieth of May.

Various attempts were made and patents granted in England prior to the holding of the World's Fair in 1851, none of which had come into use, and all of which had evidently been forgotten. The exhibition of McCormick's and Hussey's reapers at that time, awakened a fresh interest in John Bull on the subject, and a trial in the field convinced him that Brother Jonathan was fully a match for him in peace as well as war.

The earliest patent granted in the United States on Harvesting Machines, was to Richard French and John T. Hawkins, of New Jersey, May 17, 1803, for a machine to cut grain. Seventeen patents were granted prior to that of Obed Hussey, December 31, 1833, which was the first really practical reaping machine, and contained many of the elements of the machines in use at the present day.

Cyrus H. McCormick's patent was of subsequent date, his first being granted June 21, 1834.

Harvesting machines and Harvesting machinery, have long been constructed in this country. Thomas Hussey, brother of Obed Hussey, of Baltimore, the inventor of the Hussey Reaping machine, commenced its manufacture in Auburn about 1840. They were first constructed in the old oil mill which occupied a portion of the ground on which the works of D. M. Osborne & Co. now stand, and the machine, in an improved form, is now manufactured by I. W. Quick on Mechanic Street. Although Mr. Thomas Hussey was long connected with the manufacture, I cannot learn that he obtained patents for any of his improvements. Mr. Obed Hussey was one of

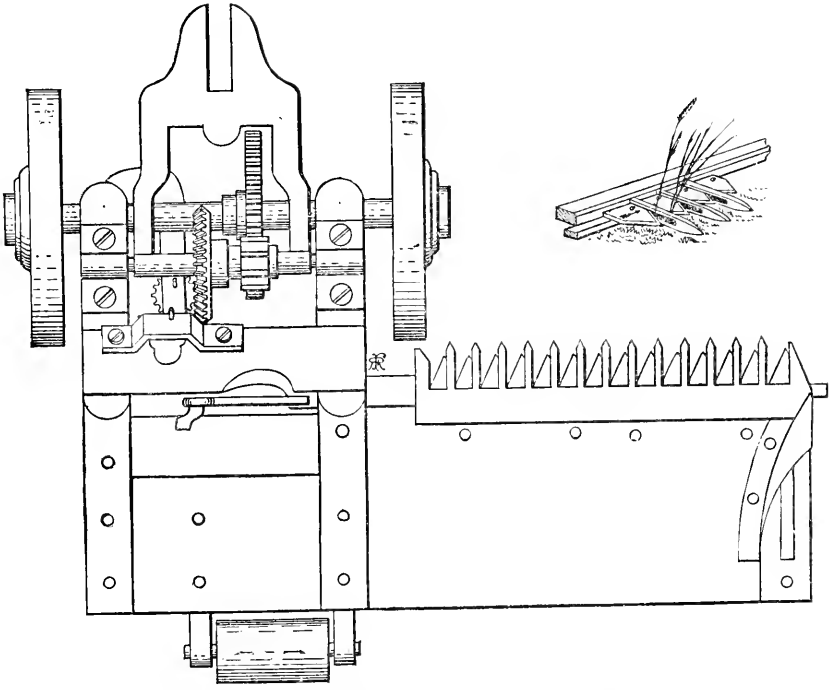


Fig. 46.—Plan View, and Section of Finger Bar of Hussey Machine.

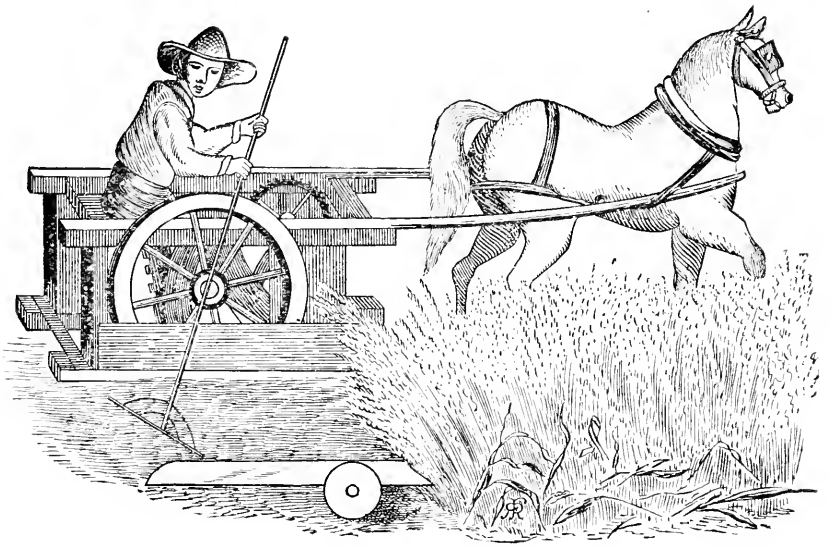


Fig. 47.—Perspective View of Hussey Machine at Work.

the earliest inventors of reaping machines, and to him the credit is due of devising a cutting apparatus and improving the same, that has stood the test of time, and remains substantially that in general use at the present day, to wit: The reciprocating escaloped cutter and the open slotted guard finger.

Among the earliest grants of patents for harvesting machines, the name of Wm. A. Kirby appears. Though some of his earlier patents were granted to him while a resident of Buffalo in this state, he may well be claimed as a Cayuga County Inventor. Mr. Kirby was born in the township of Scipio, in that part of it now known as the town of Ledyard, September 17, 1817, but is now a resident of the City of Auburn. His early educational advantages were limited and confined to the common school. When but twelve years of age, he drove a team on the tow-path of the canal from Seneca Falls to Albany and back, taking the whole care of the team on the trip. When old enough, he learned the carpenter's trade, and followed that occupation six years. He farmed it ten years, running a threshing machine and clover mill during the fall and winter months of four of those years, making all necessary repairs of the machines himself. In 1852, and during the summer, he removed to Buffalo and entered into the employment of Mr. E. B. Forbush of that place, who in July of that year, had taken out a patent for improvements in a grain and grass harvester. In the construction of the Forbush machine, Mr. Kirby afforded valuable aid.

Mr. Kirby constructed one of those machines for exhibition at the State Fair, which was held at Utica that year, commencing the work the fourth day of August and completing it the fourth day of September, ready for shipment to Utica, where it was exhibited at the fair of that season as already mentioned.

The Forbush machines were manufactured in Buffalo by a company of which the Smith Brothers were the principal parties. The company were sued as infringers of the Ketchum patents by the owners thereof, and were forced to discontinue the manufacture.

From witnessing the operation of the Forbush in the field, and with the view of remedying its defects and at the same time avoid the Ketchum patents, Mr. Kirby in 1855, undertook the construction of the Kirby machine which was completed in that year, and he obtained his first patent April 15, 1856, and the second, September 2, of the same year. The first related to the method of connecting the guard fingers to the finger bar, and projecting rivet heads and spaces in connection with the cutters and fingers. The patent of September 2, 1856, contained the important feature of pivoting the main driving and supporting wheel to an arm which was in turn hinged to the frame of the machine concentric to the first gear shaft; which arrangement permitted the wheel to swing on its hinged connection with the gear frame, independent of it and the frame; and the cutting apparatus connected therewith to rise and fall independent of the up and down motions of the road wheel. A seat for the driver was pivoted to the frame of the machine and fulerumed on the axle and its arm, so that the weight of the driver was added to the wheel to give it sufficient adhesion to the ground to drive the cutters, and at the same time relieve the cutting apparatus and frame from undue pressure on the ground, when used in mowing; by this arrangement of the wheel and frame, the cutting apparatus could be set at different heights from the ground for reaping grain.

To an understanding of this arrangement, and its distinctive difference from the Forbush machine, it may be stated that in the Forbush machine, the main driving and road wheel was rigidly connected to the frame of the machine so

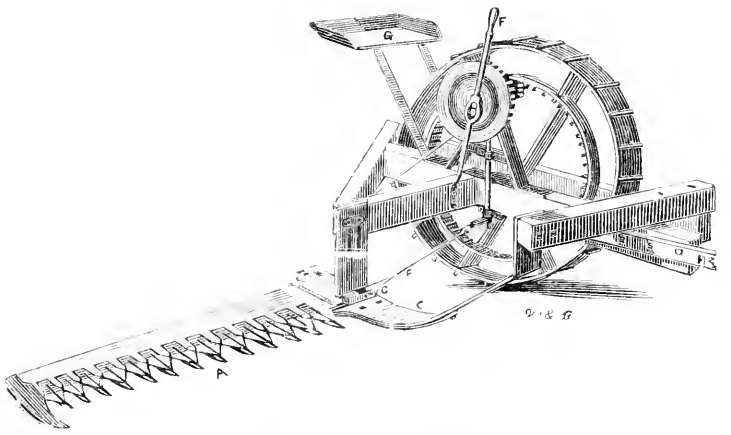


Fig. 48.—Forbush Machine as a Mower

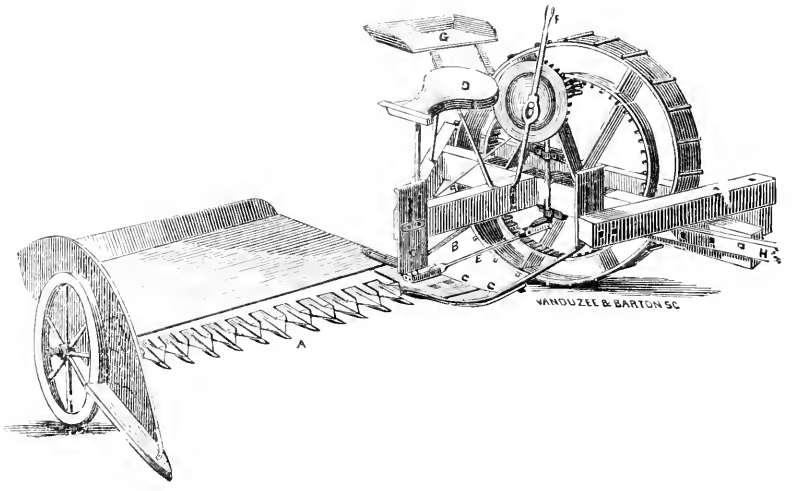


Fig. 49.—Forbush Machine as a Reaper.

that the frame work and cutting apparatus partook of the up and down movements of the wheel when passing over the ground; the cutter apparatus at its inner end or point of connection with the frame, being influenced by the vertical movements of the main wheel, which by the arrangement of the Kirby devices was avoided.

The Forbush was constructed with bracket connections between the frame work and finger bar, by which means, the cutting apparatus could be set at varying heights for converting it into a reaper. In this respect, the Forbush was an improvement on the Ketchum machine, which could only be converted into a reaper, by an enlargement of the main wheel by bolting lugs or segment rims to its periphery, which admitted only of a limited adjustment in the height of the cutting apparatus.

The controlling feature in the Ketchum machine, was an *unobstructed space* between the driving wheel and the finger bar and its supports. In this respect the Forbush and the Ketchum machines were alike; but in the Kirby, the finger bar was extended at its inner end, close to the main wheel, thus closing substantially the open space between the wheel and cutting apparatus; the independent up and down movement of the wheel permitting the cutting apparatus to follow the ground in mowing.

Mr. Kirby has from time to time made improvements in his machine which was, with the Ketchum and Forbush types, denominated "one-wheeled machines." He has also made improvements in two-wheeled machines and revolving reel rakes, for all of which he has obtained patents, numbering in all, on harvesters, seventeen, besides several others for improvements in other departments of which it is not necessary to more particularly speak.

The manufacture of the Kirby machine was commenced in Buffalo, N. Y., by the Buffalo Agricultural Works, Mr.

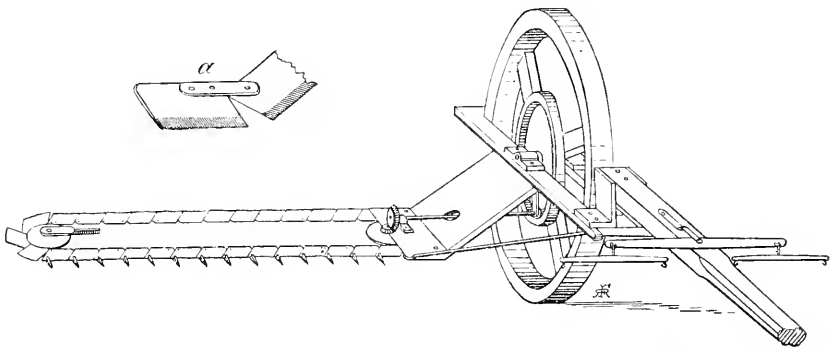


FIG. 50.—Perspective View of the Ketchum Machine. *a*, Section of Cutter Knives.

D. M. Osborne, being one of the company. In 1858, two hundred of these machines were manufactured in Auburn, by Mr. O. H. Burdick, for Osborne & Holbrook, the firm

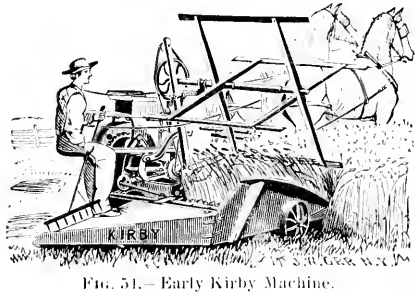


Fig. 51.—Early Kirby Machine.

consisting of D. M. Osborne and O. I. Holbrook. In 1859 the firm of D. M. Osborne & Co. was formed for the manufacture of these machines in Auburn. D. M. Osborne, Cyrus C. Dennis and Charles P. Wood composed the firm. Mr. Wood retired in 1862, and Mr. Dennis died in 1866. After the death of Mr. Dennis, Mr. John H. Osborne and Mr. O. H. Burdick became partners. These machines continued to

Fig. 52.—Later Kirby Machine.

be manufactured extensively by the firm up to 1875, when the Cayuga Chief Manufacturing Company became consolidated with the Co., and organized under the manufacturing laws of the state as a stock company under the name and style of D. M. Osborne & Co.

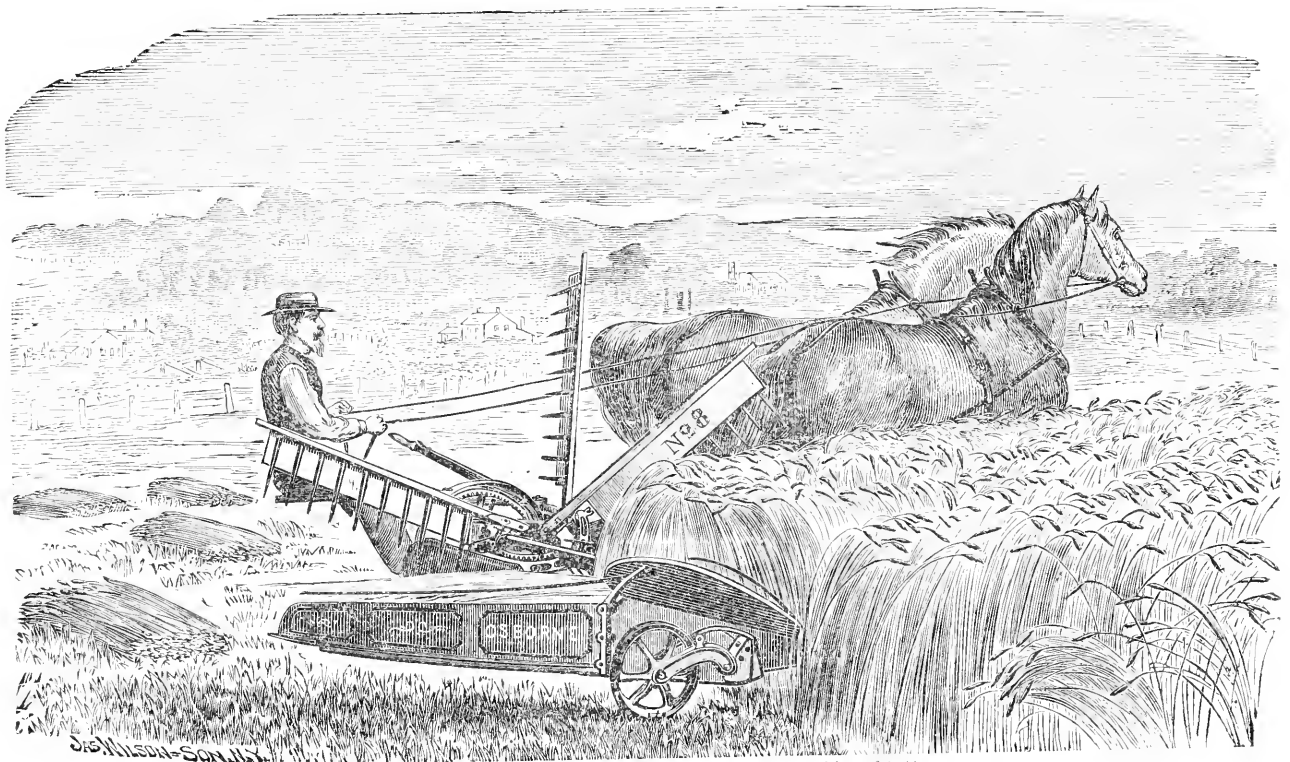


Fig. 53.—Osborne Independent Light Reaper. Kirby Machine of 1882.

In 1880, the number of machines manufactured by this company reached 16,000, and the company furnished employment for one thousand of the citizens of Auburn.

The Kirby machine continued to be manufactured at Buffalo and at Cambridge City, Indiana; and in limited numbers for a short time at other points. The whole number of machines of the Kirby type manufactured up to the present time will not fall short of 120,000.

It is believed that six years is about the average life time of machines in use, and that they average a yearly use of about eighteen days, or one hundred and eight days use in the life of the machine. A saving of $12.00 per day over the performance of the same work by hand, is, without doubt made, or $1,296.00 for each machine, or $155,552.00 is saved to the farming public and the country over hard manual labor, by the use of the Kirby machine alone. The magnitude of these figures is surprising, but they fall far short of the saving made by the later combined harvester and binder constructed by D. M. Osborne & Co. at the present time, which has the capacity to cut and deliver in bundles, twenty acres of grain daily, a saving of nearly double that made by the ordinary harvester.

Machines manufactured at Auburn by D. M. Osborne & Co., now find a market in nearly all of the grass and grain growing portions of the habitable globe; and they are in use as aids in gathering the harvests of the world every month in the year. To-day, though mid-winter here, the click of Auburn manufactured machines is heard by our antipodes in far off Australia and South America as they sweep down and gather into bundles the ripened grain of those countries.

Mr. Kirby removed his family to Auburn in 1863, though he for several years previous had spent the most of his time in this city. Mr. Kirby in early life was without pecuniary means, and for years it was an unceasing but uncomplaining

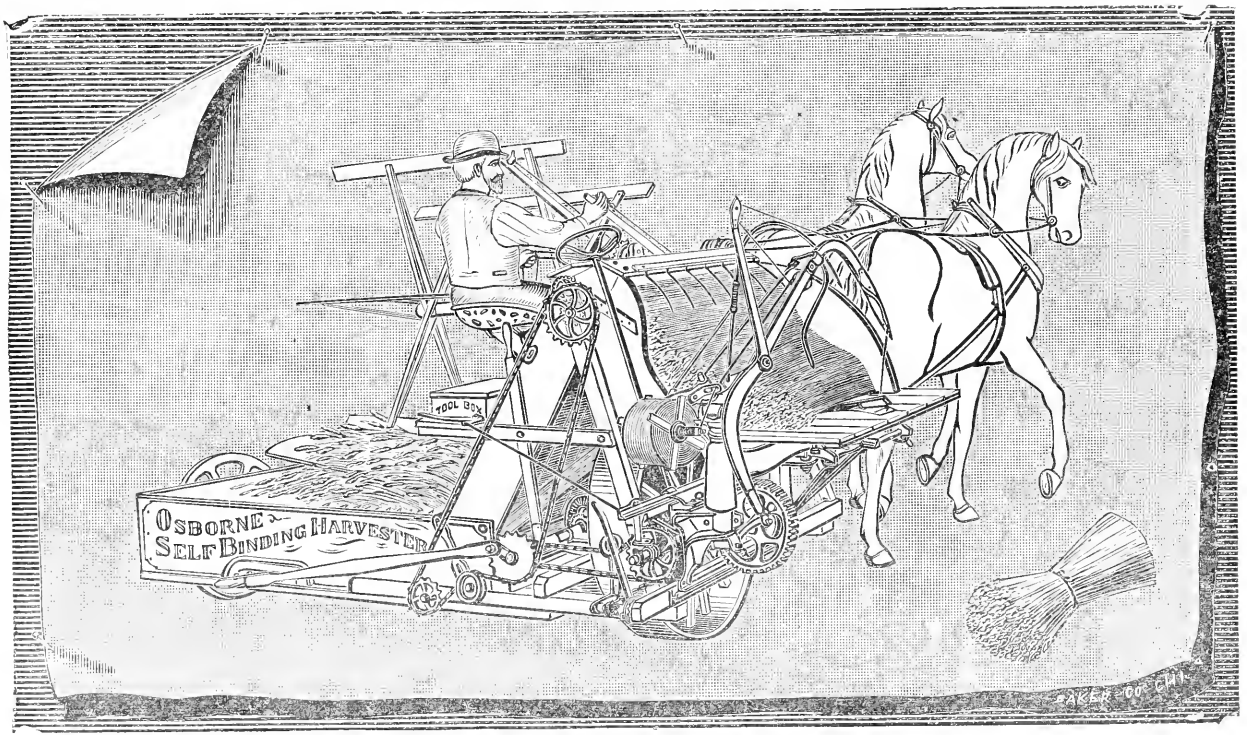


FIG. 54.—The Osborne Self-Binding Harvester.

struggle with poverty. With fixed purpose and a courage that was equal to the occasion, untiring industry marked his efforts, and success was the result.

Mr. O. H. Burdick, another inventor of Cayuga County, has also for a long time been closely connected with the reaping and mowing machine industry of the County. To him has been granted several patents for improvements made by him in harvesting machinery. The first bears date June 7th, 1864, and was for an improvement in self-rakes; a rake that was arranged to sweep in the arc of a circle across a quadrant shaped platform, and had a rising and falling motion so that it could make the return movement without disturbing the accumulating grain on the platform. This rake was operated in conjunction with a reel rotating on a horizontal axis. This was used on machines manufactured by D. M. Osborne & Co. about two years, and was followed by a further improvement by Mr. Burdick, which was a rake of another type, known as the reel rake, and on which he obtained a patent dated February 27, 1866. This latter, was further improved and a patent obtained therefor, December 8, 1868. In this type of rakes, the operation of gathering and bringing the grain to the cutters and laying it on the platform, as well as discharging it therefrom in gavels suitable for binding, is performed by the same organized mechanism, instead of by separate devices, as with the first named rake. It was extensively used on the Kirby machines and on a machine organized expressly for its use and known as the "Burdick Reaper." About 35,000 of these rakes have been made and sold up to the present time.

Mr. Burdick also obtained a patent in conjunction with Mr. O. F. Daggett, for improvements in two-wheeled mowers, which has also been constructed by Messrs. D. M. Osborne & Co. He has also obtained patents for fastenings for foundrymen's flasks, photograph printer's frames, and for a vegetable slicer.

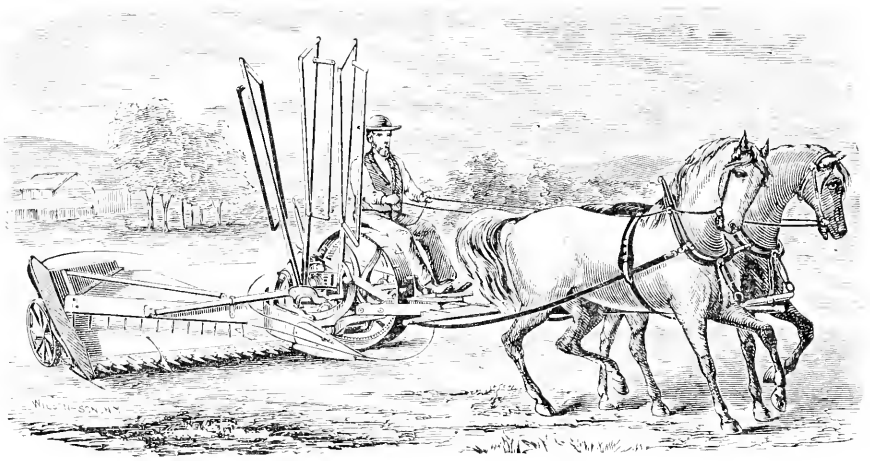


Fig. 55.—The "Burdick Reaper."

Mr. Orrin H. Burdick was born in Brookfield, Madison County, N. Y., November 14, 1814. His parents moved from there to Cortland County, when he was but two years old. His educational advantages were confined to the common school, and for a very limited time only. When eight years old he worked in a machine shop, and from that early age was dependent on his own resources for a livelihood. He mastered the machinist's trade, and in the spring of 1835, when twenty-one years of age, he came to Auburn and found employment in the shop of Burgess and Sprague, which stood at that time on the same ground now occupied by the D. M. Osborne & Co. factory, on Mechanic Street. The firm was engaged in manufacturing saddler's and harness maker's tools. He remained in Auburn until 1841, when he moved to Port Byron, and found employment for two years in the machine shop of E. P. Ross and Jonathan Seymour, on mill and job work; after which, he found employment for three years with David Anthony at Union Springs on similar work.

In 1847, Mr. Burdick returned to Auburn and was employed in constructing machinery and building the first carpet looms for Barber's Carpet Factory, and personally started all of them when completed. Afterwards, he started a shop and manufactured straw cutters for Watrons and Osborne on contract, and subsequently for the firm of Osborne, Barker & Baldwin, until Mr. D. M. Osborne bought out his partners and assumed the manufacture himself, employing Mr. Burdick by the year, Mr. Burdick furnishing tools.

Subsequently, Mr. Burdick purchased a building on Water Street, where he started a shop for general job work and repairs, and in 1857, manufactured on contract for Dean, Mackin and Alden, the Wheeler machines, the first of that type manufactured in Auburn. In the fall of that year, he moved to the corner of Genesee and Mechanic Streets, where he manufactured for Osborne & Holbrook, two hundred

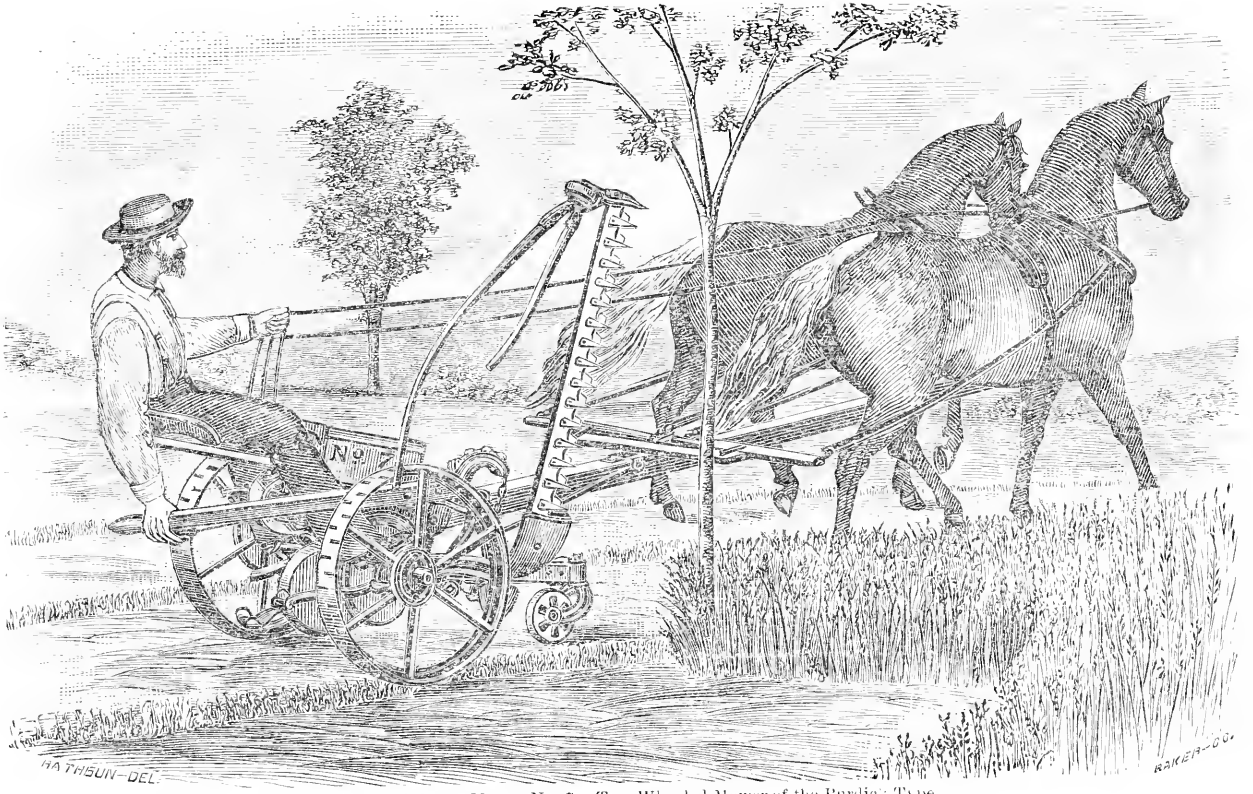


Fig. 56.—Osborne Mower No. 7. Two-Wheeled Mower of the Burdick Type.

Kirby machines, the first of that type made in this County. From that time to the present date he has been identified with the construction of the machines manufactured by D. M. Osborne & Co., in Auburn. Mr. Burdick is a self-made man, who with few advantages, by perseverance and strict attention to business has achieved success.

In this connection, it is proper to mention another Cayuga County inventor, whose name is inseparably connected with the reaping machine industry of this County. His patented inventions relate to pitman connections for harvesters, and whilst the inventor, the Hon. D. M. Osborne, may not claim that his particular forte is invention, he posesses, it will be admitted, in an eminent degree that business capacity as a manufacturer which goes far towards making inventions a success. He was born in Harrison, Westchester County, N. Y., December 15, 1822. In early days was a clerk in a hardware store in New York City. He came to Auburn in 1848, and engaged in the manufacture of Straw cutters on the corner of Genesee and Mechanic Streets, and subsequently, as I have stated, in the manufacture of the Kirby machine in the same building in which the office of D. M. Osborne & Co. now is, in 1858; which has been enlarged from time to time as the requirements of the constantly increasing business demanded, until it has reached a magnitude that he, at its early inception, could scarcely have anticipated. With the enterprise and business capacity of an Osborne, and the inventive talent of a Kirby and Burdick united, success was assured.

John A. Dodge, another inventor of Cayuga County, was born in Dutchess County, in this State, and became a resident of this County in 1833, with his father, Doctor David L. Dodge, who settled at Union Springs in that year, and for many years was a practicing physician there. When a young man, he clerked it for his brother-in-law, George Mosher,

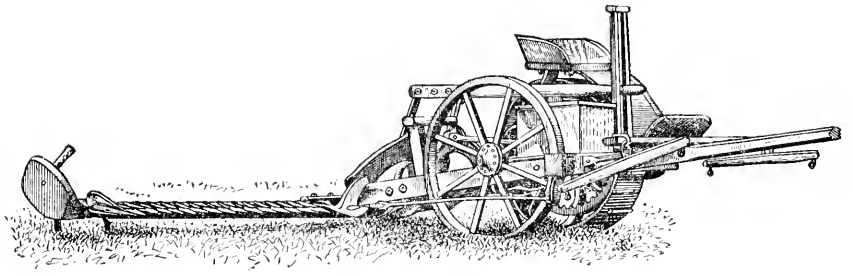


Fig. 57.—Early Wheeler Machine, 1854-5

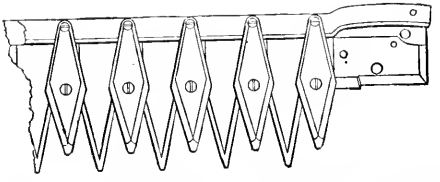


Fig. 58.—Cutting Apparatus of First Wheeler Machine, 1853.

who kept a store at Poplar Ridge. He afterwards became a Rail Road contractor, and subsequently a coal dealer in this city, and in 1858, became the managing head of the firm of Ross, Dodge and Pomeroy, which firm engaged in the manufacture of small agricultural tools and wheel-barrows in Auburn Prison. They also engaged, (in connection with Sheldon & Co., who had a contract in the prison,) in the manufacture of what was then known as the Wheeler Combined Mower and Reaper. Subsequently they engaged in the manufacture of the Ball machine: Sheldon & Co. taking the Wheeler. After this Mr. Ross and Mr. Pomeroy retired, and the Ball machine was superseded by what was known as the Dodge machine, and an incorporated company, know as the Dodge and Stevenson Manufacturing Co., engaged quite extensively in its manufacture.

On this machine Col. Dodge obtained seven patents individually, and two in connection with others. One with George Perry of this city, and another with Wm. H. Stevenson then residing here. These patents were principally improvements relating to the *reel rake*, and were of considerable importance. The improvements consisted of devices which governed the reeling and raking mechanism: the switch and roller controlling the arms being arranged outside of the pivoted axis of the arms.

The company went into liquidation, and in 1874, Beardsley, Wheeler & Co. purchased, with the patterns and parts of the machine, a shop right under those patents. The other interests in the rake patents were previously sold by the company to a certain firm of Reaper manufacturers for the sum of seventy five thousand dollars. Col. Dodge is now a resident of New York City and has a broker's office in Wall Street.

In the department of harvesting machinery inventions, the name of Cyrenus Wheeler, Jr., appears. Thirty-nine

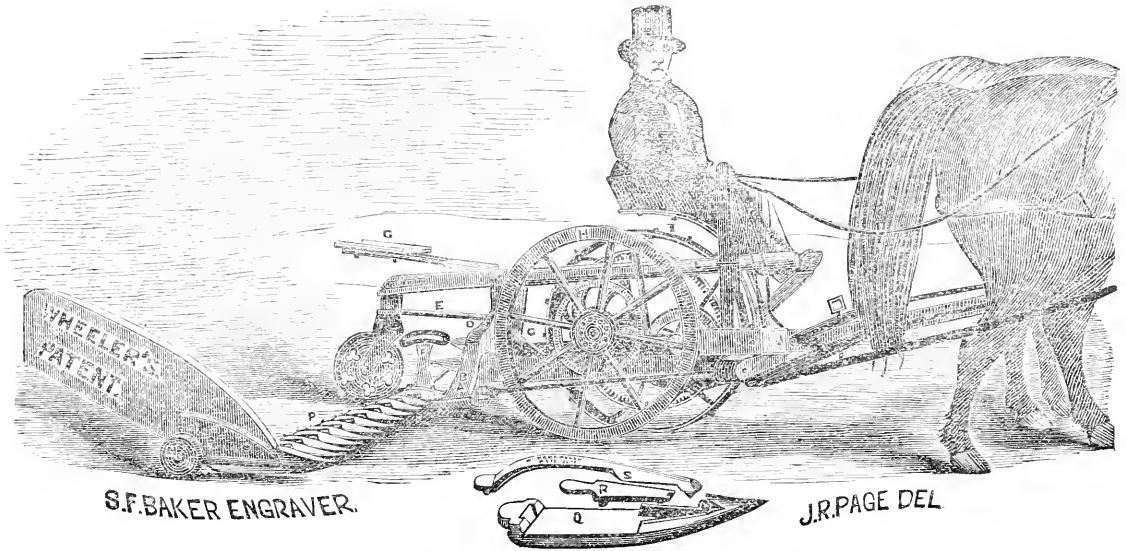


Fig. 59.—Early Wheeler Machine. 1856.

patents were granted to him in that class, and several in other classes to which it is not necessary to refer particularly.

His first patents, and perhaps the most important ones, bear date December 5th, 1854, and February 6th, 1855. Prior to this time, machines had been constructed with rigid finger bars. These improvements consisted in supporting the frame work and gearing of the machine on two wheels, and connecting the finger bar by hinges, and providing levers for lifting and rocking it, so as to elevate or depress the points of the cutters. In 1854, a platform, reel, and raker's seat were added, thus making it a combined machine. In the winter of 1855 a self rake was applied and used in the harvest of 1856 quite successfully in standing grain. On these improvements patents were obtained, and from that time onward successive patents were obtained for other improvements made, to none of which particular reference need be made, except that of February 9th, 1864, which was for a combination and arrangement of gearing, rendering it more compact and better adapted to the purpose of casing or boxing. The first machine was made at Poplar Ridge, Cayuga County, in a shop carried on by Shourds and Mosher, and the first trial was made one mile south of there on the farm of the inventor. The cutting apparatus used at that time was an arrangement of pivoted shears.—See Fig. 58.

The trial was made in grass soaked by recent rains, and was satisfactory; but the following season's use of the same kind of cutters developed the fact that those cutters were better adapted to wet than dry grass, and the Hussey cutters and fingers were substituted in their place. These machines continued to be manufactured at Poplar Ridge up to 1860, reaching several hundred in number annually, when the establishment was moved to Aurora and continued there up to 1866. After the harvest

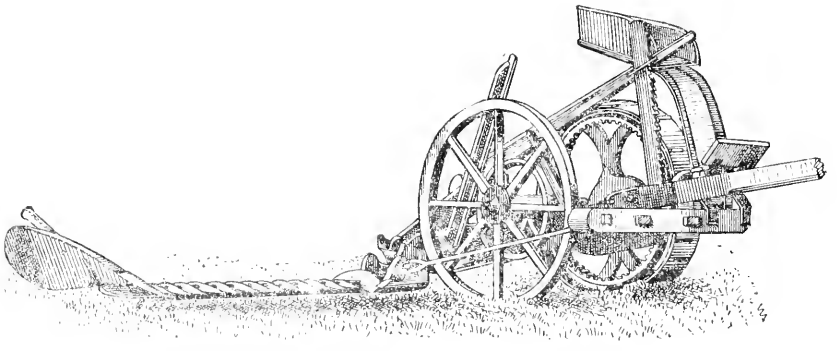


Fig. 60.—Wheeler Machine of 1857.

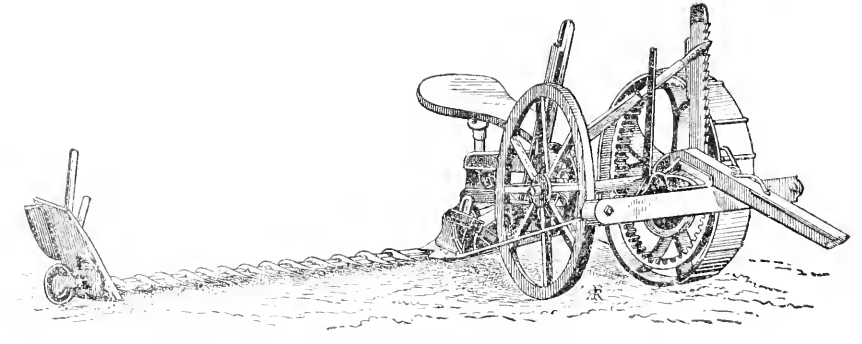


Fig. 61.—Wheeler Machine of 1858–59.

of that season, it became consolidated as a stock company, with the Burtis and Beardsley, and Barber, Sheldon & Co. firms, who were manufacturers of the same machine at Auburn, under the name and style of the Cayuga Chief Manufacturing Company. This company, in 1875, became consolidated with D. M. Osborne & Co. as a stock company, under the continued name of D. M. Osborne & Co., which firm continues their manufacture at the present time.

In 1857, Orrin H. Burdick manufactured about one hundred of these machines for Dean, Machachin & Alden. In 1858, Ross, Dodge and Pomeroy, in connection with Sheldon & Co., manufactured the same machines in the prison, and Barber, Sheldon & Co., who succeeded Sheldon & Co. in the prison, continued their manufacture up to 1866.

Several thousands of these machines were manufactured at Alliance, Ohio, and in lesser numbers at other places.

From 1854 up to the present time not less than 85,000 Wheeler machines have been manufactured in this country, and the whole number of two-wheeled hinged finger-bar machines manufactured in this country, up to the present time, will not fall short of 940,000.

The several modifications of machines of the "Wheeler Type," are very distinctly shown by the several and preceding cuts. The earliest, or 1854 machine, was destroyed before any picture of the same was obtained, but Fig. 57 is a fair representation thereof with the exception of the cutting apparatus, which was somewhat different, and is shown clearly in Fig. 58.

Fig. 59 shows the machine as used for mowing in 1856. The same machine was also used for reaping, the platform and reel not being shown in the illustration.

Fig. 60 is a modification of the same machine, as used in 1857; and Fig. 61 shows another modification as the machine was used in the years of 1858 and 1859.

FIG. 62.—"Cayuga Chief" Mower in Operation. Wheeler Machine of 1860.

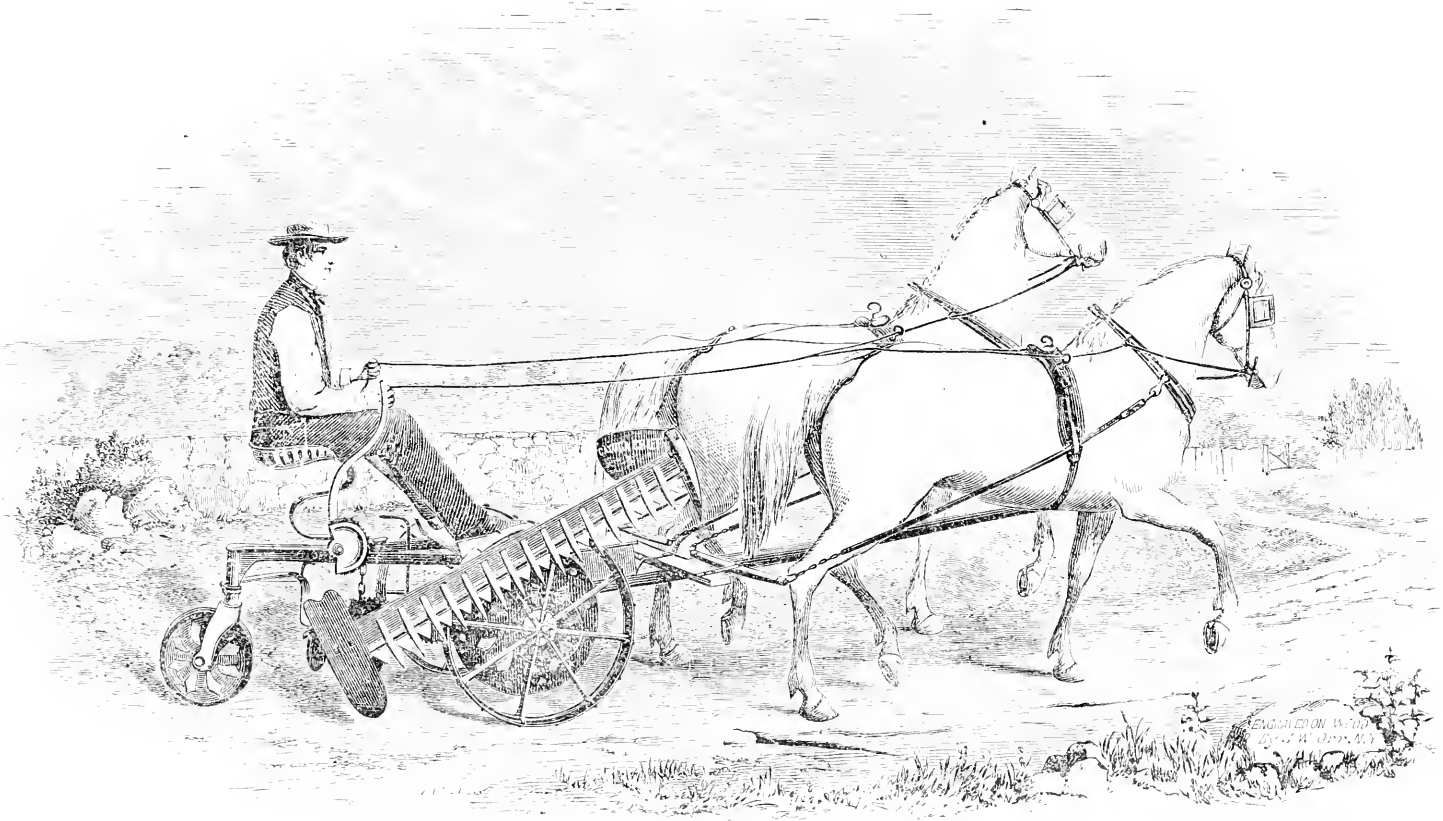


Fig. 63.—"Cayuga Chief" Mower with Cutter Bar Folded Up for Road. Wheeler Machine of 1860.

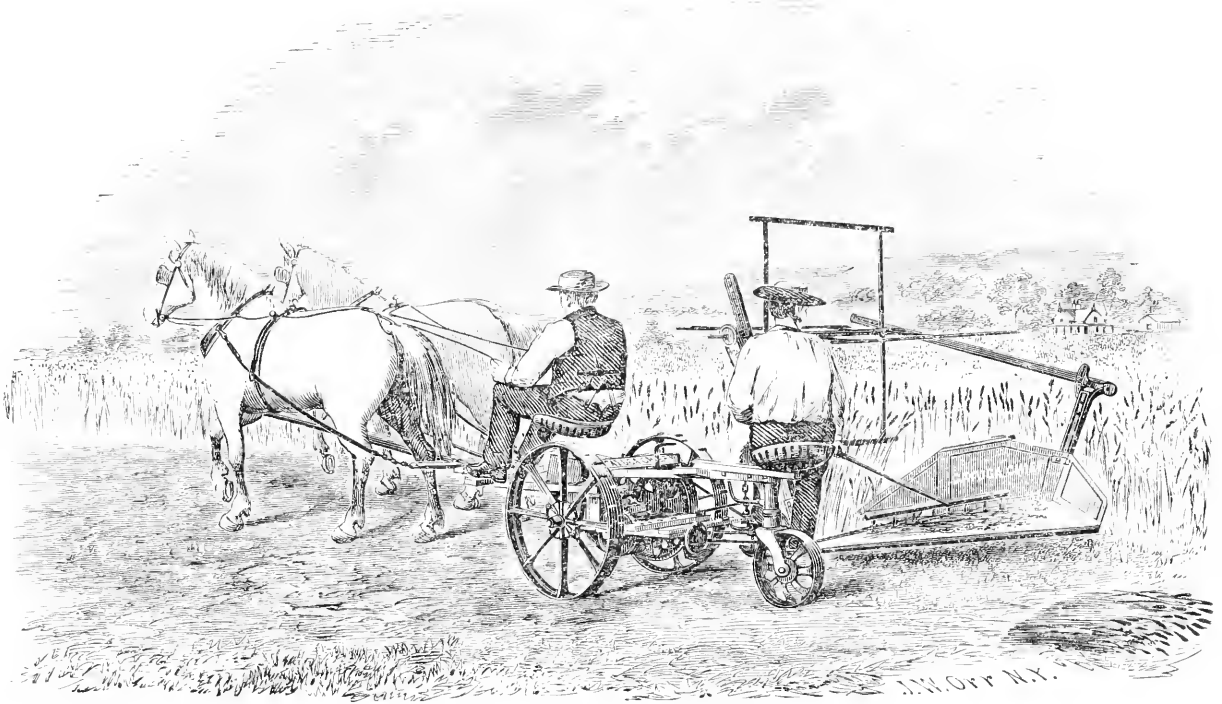


FIG. 64.—"Cayuga Chief" of 1860—as a Reaper.

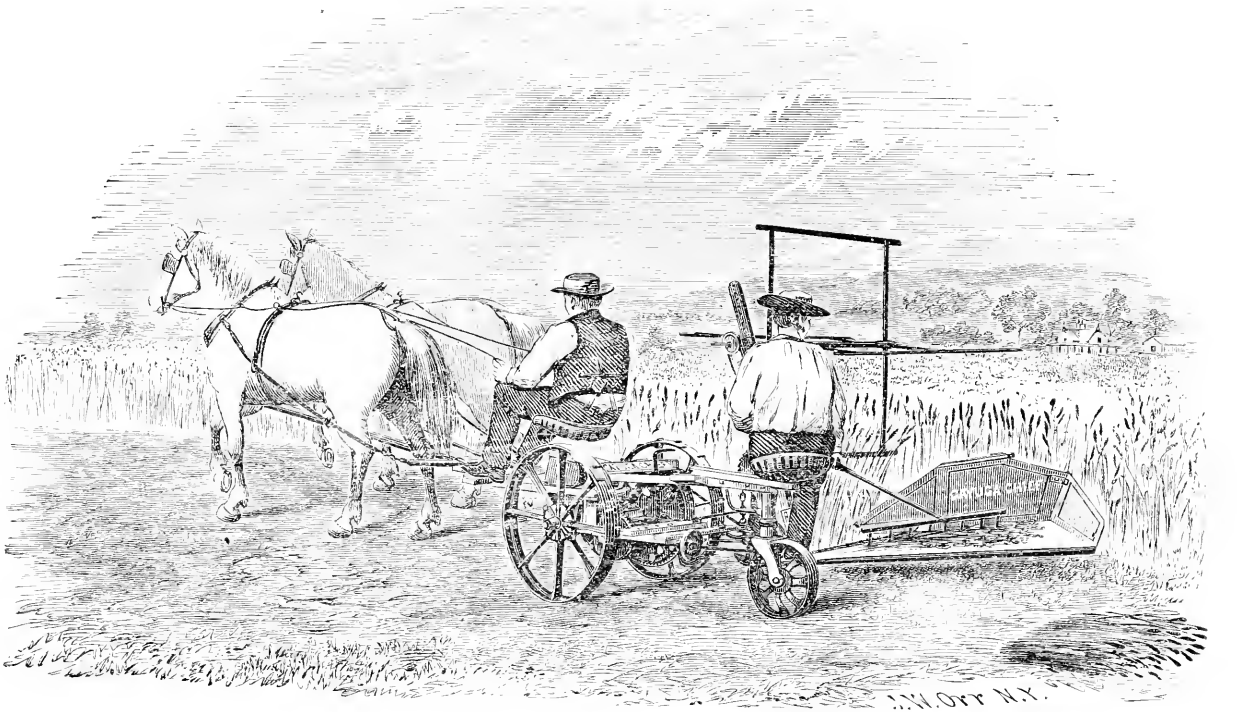


FIG. 65.—"Cayuga Chief" of 1861—as a Reaper, having Overhanging Reel.

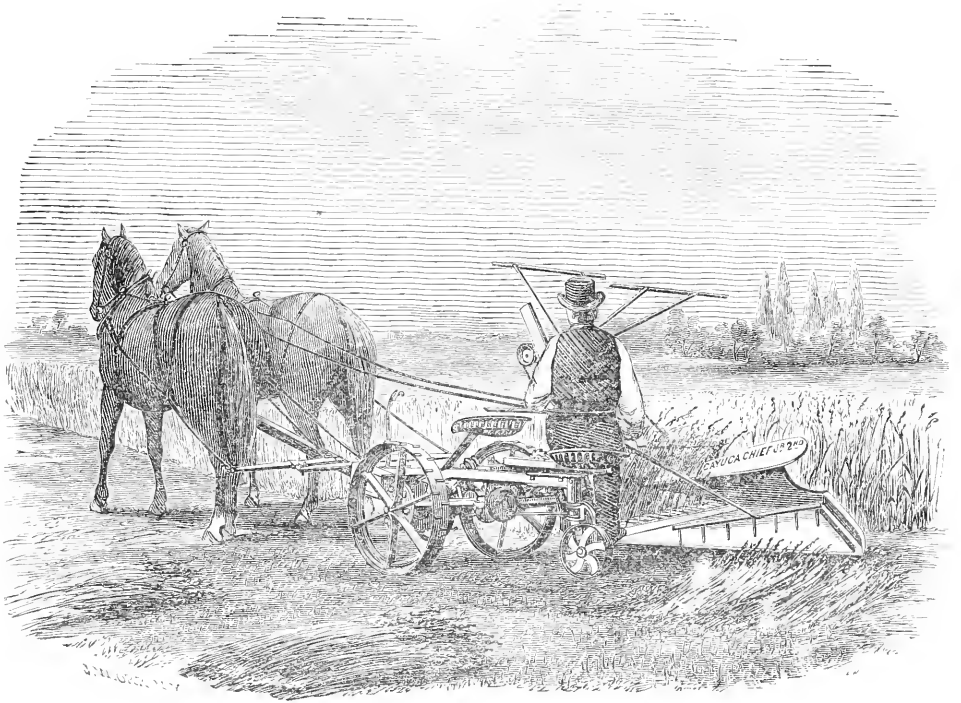


Fig. 65.—"Cayuga Chief," No. 2, as a Hand Raking Reaper in 1862.

Fig. 67.—"Cayuga Chief, Jr."- Mower of 1861.

Fig. 68.—"Cayuga Chief, Jr."—on the Road, 1861.

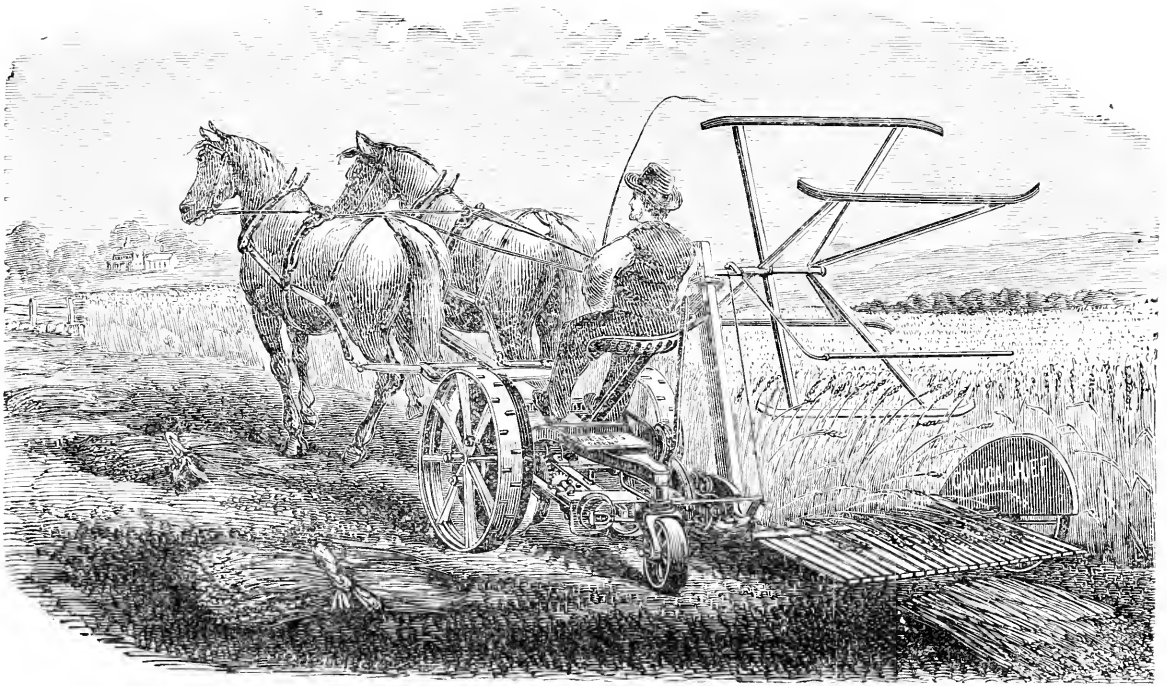


Fig. 53.—"Cayuga Chief" as a "Dropper"—1894.

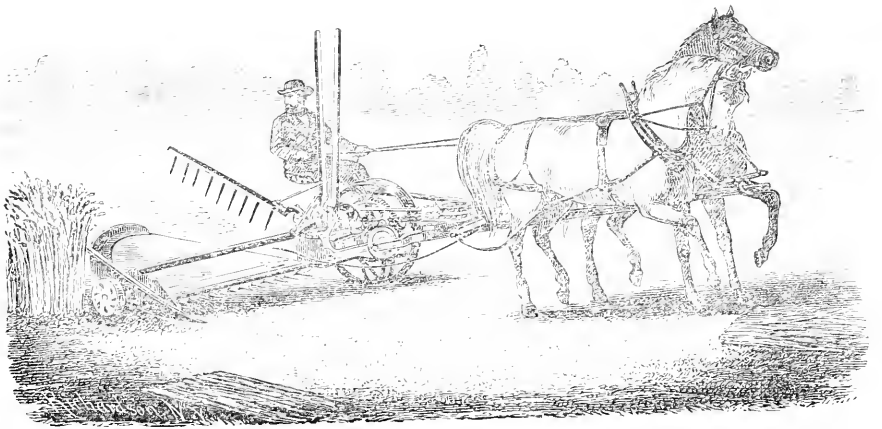


FIG. 70.—The Wheeler Single Reaper of 1866.

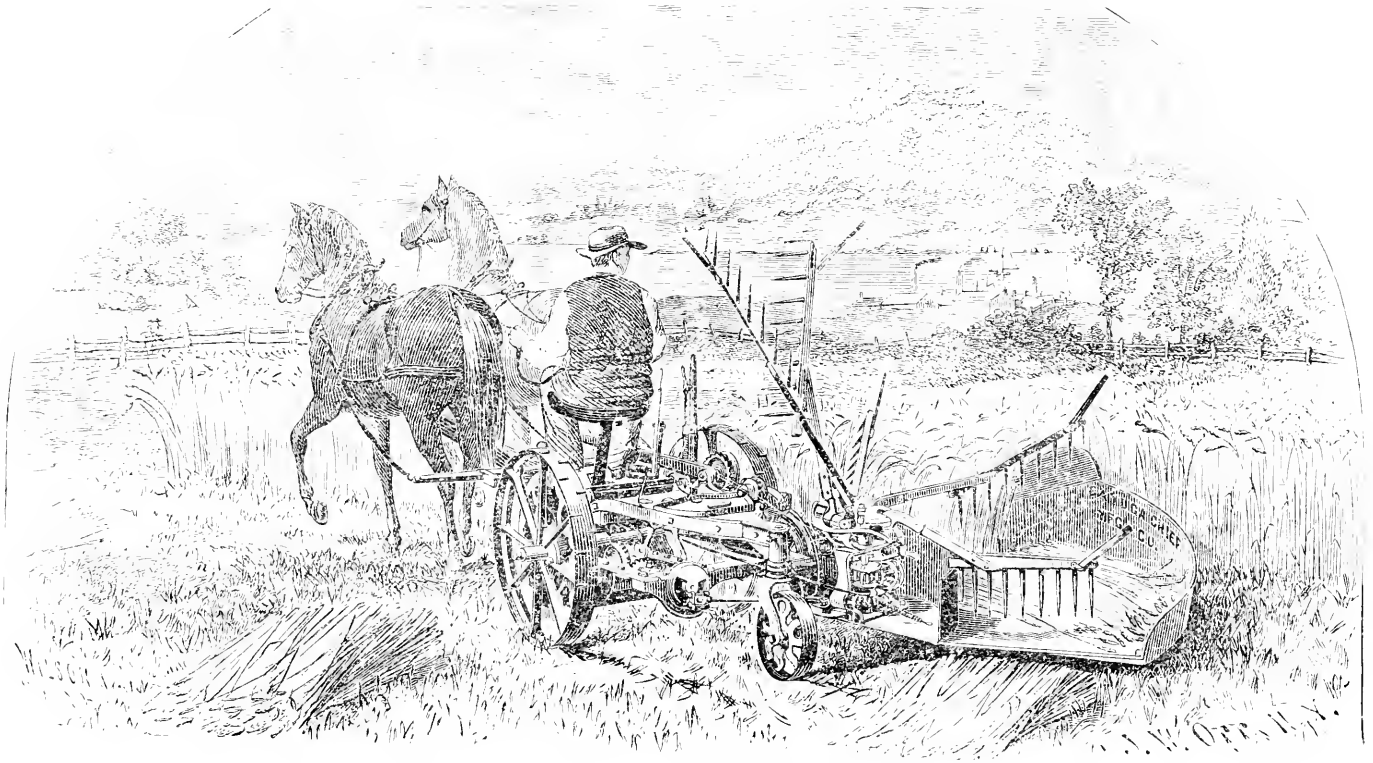


Fig. 71.—"Cayuga Chief" of 1867, with the Johnson Self-Rake

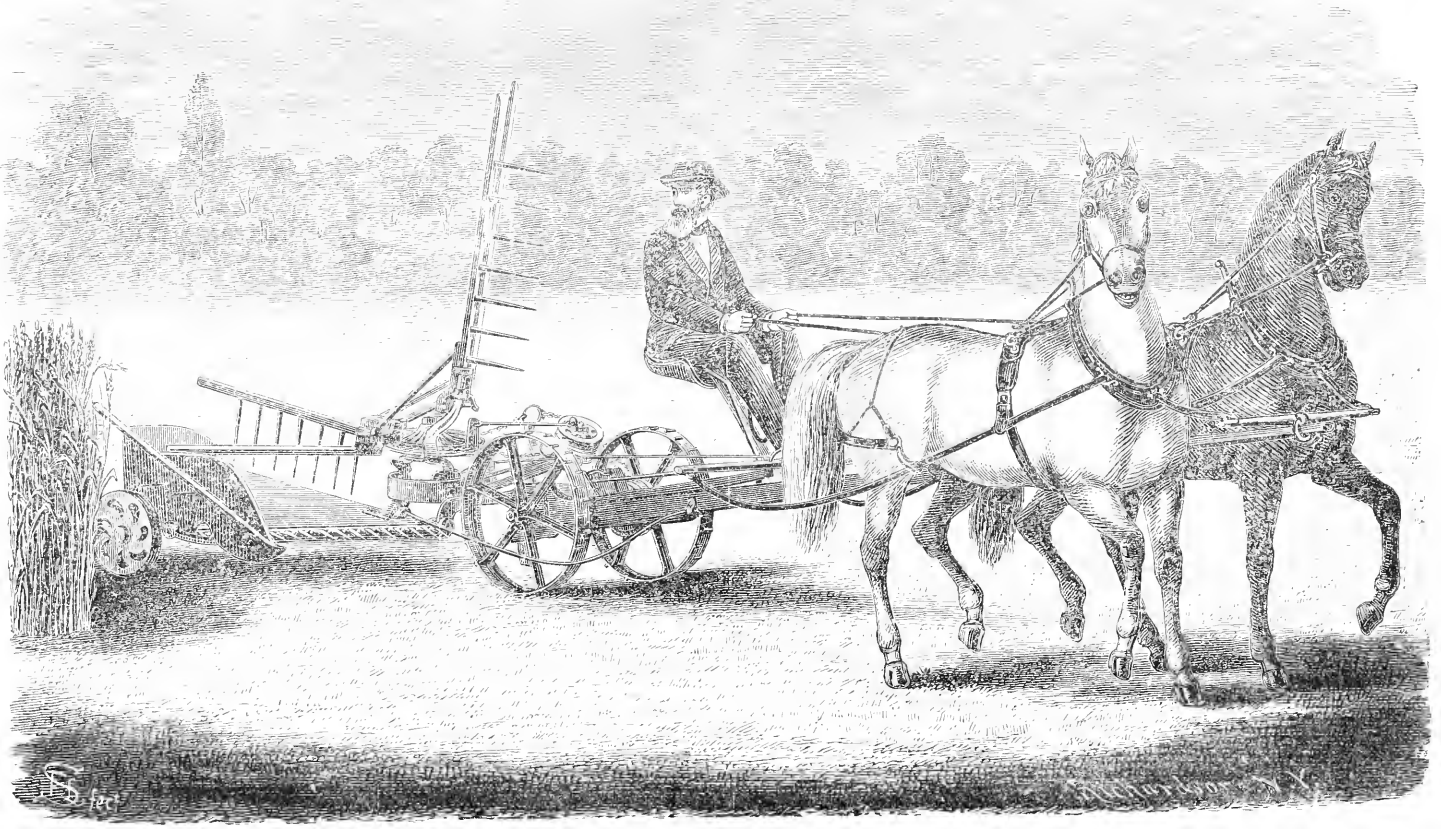


Fig. 72.—"Cayuga Chief" Self Raking Reaper, No. 2, 1868.

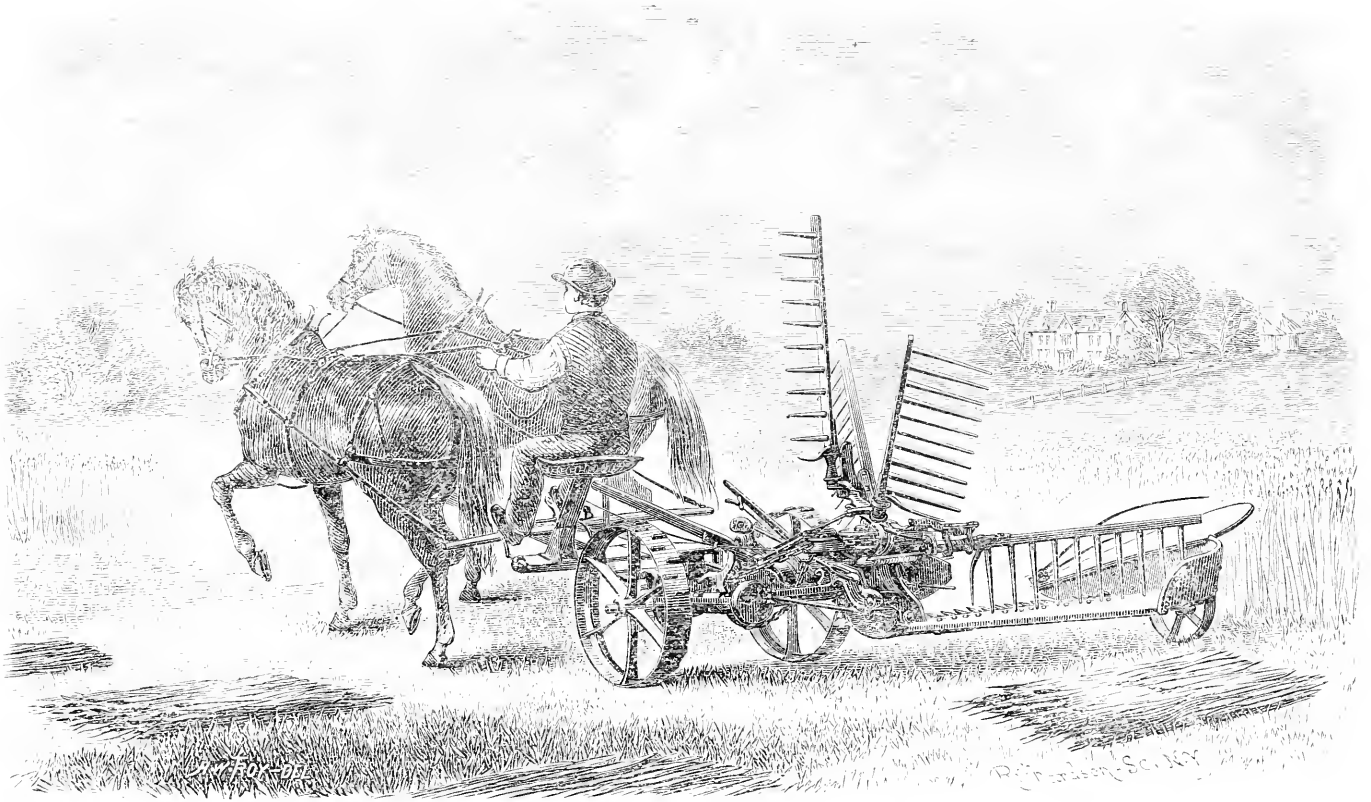


Fig. 73.—"Cayuga Chief" Self-Raking Harvester of 1869.

Fig. 74.—No. 6 Wheeler Mower, 1872.

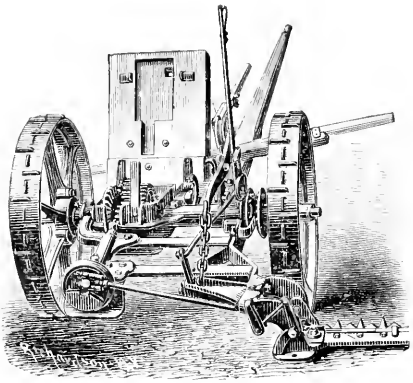


Fig. 75.—Wheeler Mower No. 6, with Cover Raised to Show Gearing.

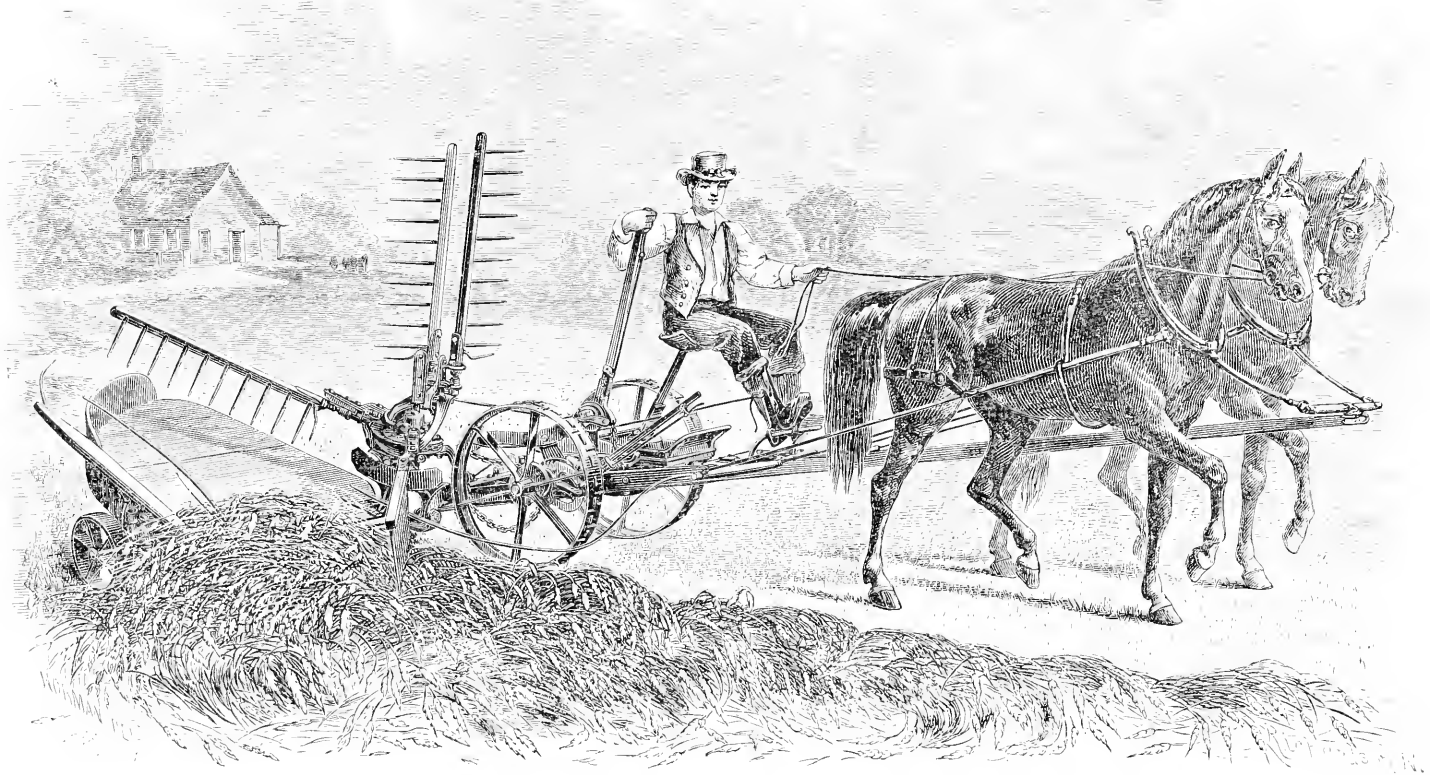


Fig. 76.—Wheeler No. 6 Combined Mower and Self-Raking Reaper—at Work in "Down Grain," 1873.

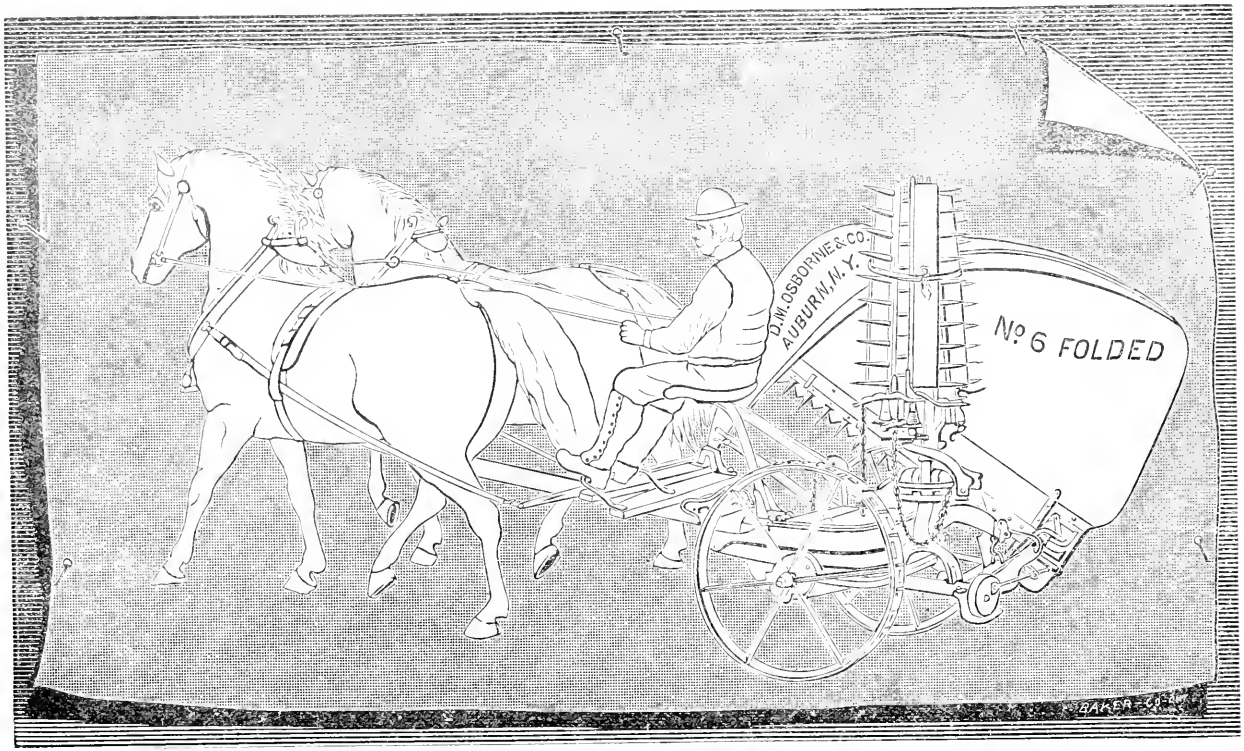


Fig. 71.—Wheeler Combined Machine No. 6, with Platform Folded. Mower and Self-Raking Reaper of 1875.

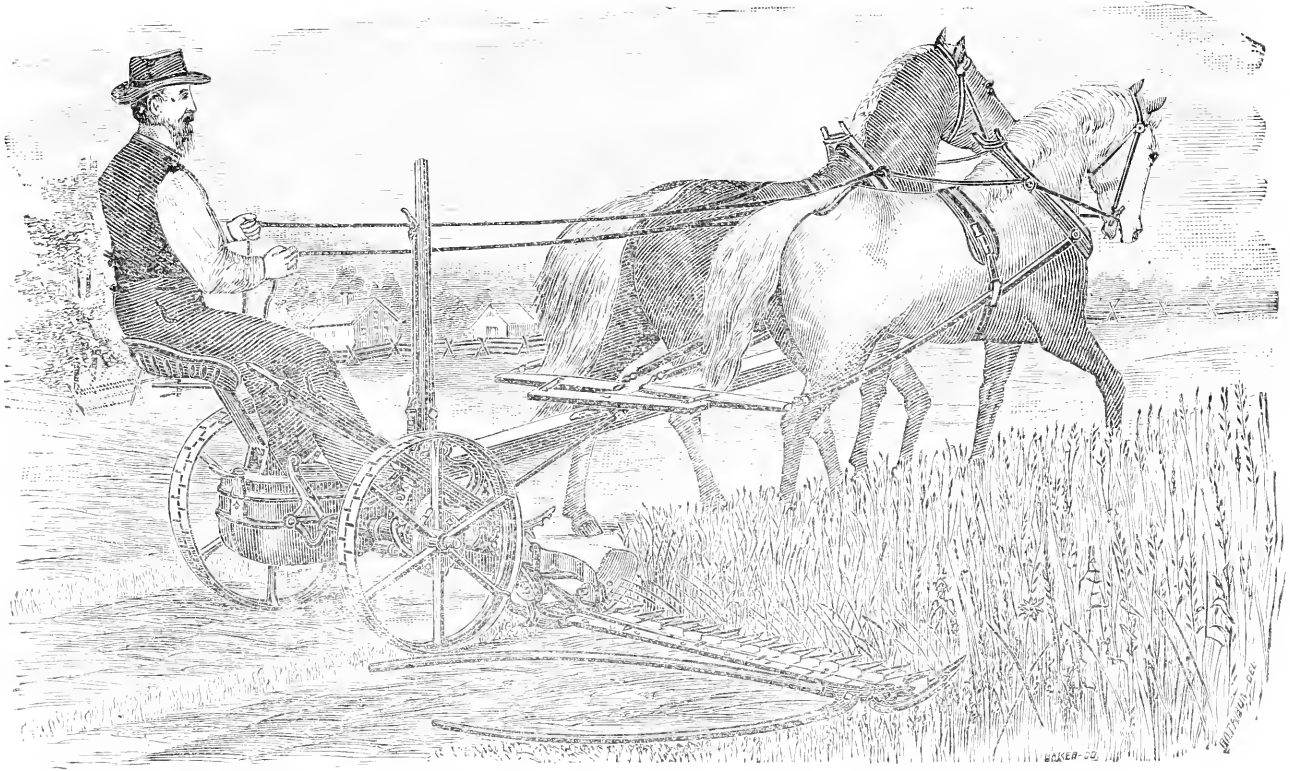


Fig. 78 - Independent Mower, No. 2, Front Cut. Wheeler Machine of 1881.

In 1860, the construction of the machine was changed by substituting wrought iron and steel for wood, and the distinctive name of "Cayuga Chief," adopted for it. Fig. 62 represents the machine as a mower, and Fig. 63 shows the finger bar folded and the machine on the road. This system of folding the finger bar around by the side of the machine, as shown, was adopted in the earlier machines and was covered by letters patent.

Fig. 64 represents the machine as used in 1860, for reaping. Fig. 65 represents the same machine as used for reaping in in 1861, an "overhanging reel" being used. Fig. 66 represents a smaller sized "Cayuga Chief No. 2," as used for reaping in the year of 1862.

Fig. 67 represents a small mower, called the "Cayuga Chief, Jr.," as used in 1862; and Fig. 68 shows the same machine with the finger bar folded, and on the road.

Fig. 69 represents the "Cayuga Chief No. 1," in use as a "Dropper" in 1864.

Fig. 70 shows a one-wheeled self-raking reaper as used in 1866, and known as the "Auburn Harvester."

Fig. 71 is the "No. 1, Cayuga Chief," as used in the harvest of 1867, with the Johnston self-rake applied.

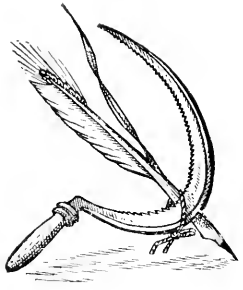
Fig. 72 represents the "Cayuga Chief," with self-rake attachment as used in 1868, two of the heads being what is known as "rolling heads." The same machine is shown in Fig. 73, with all "rolling head" rakes, and a different modification of the driving chain as in use in 1869 and 1870.

Fig. 74 represents the Wheeler No. 6 as a mower in use in 1872. Fig. 75 shows the same machine with the protecting cover raised to exhibit the arrangement of the gearing.

Fig. 76 represents the No. 6 as a "Self Raking Reaper" and as used in 1873. The same machine is shown in Fig. 77, with the finger bar and platform folded up, for traveling on the road, and Fig. 78 represents the "Wheeler front-cut

Mower" of 1881, and known at the present time as the "Osborne No. 2, Independent Mower."

In conclusion it may be stated that in preparing this article for the press, in the spring of 1882, it has been deemed advisable to introduce cuts to illustrate the descriptive matter and give a better understanding of the several subjects and their various stages of progress to the present state of development.

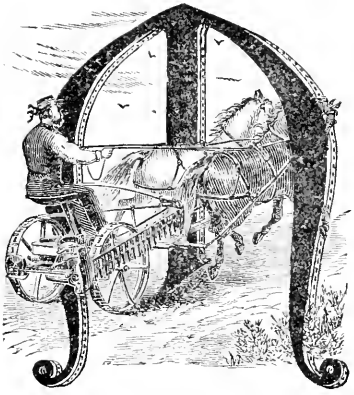


SUPPLEMENT TO "THE INVENTORS AND INVENTIONS OF CAYUGA COUNTY, N. Y."

Read before the Cayuga County Historical Society, at Auburn, N. Y., December 21st, 1880.

BY DAVID M. OSBORNE.

SUPPLEMENT TO "THE INVENTORS AND INVENTIONS OF CAYUGA COUNTY."



R. PRESIDENT:—I have one reason for regretting that some other member of this Society had not been charged with the work of writing a paper on "Inventors and Inventions of Cayuga County," and that reason is, that while no man understands the subject better or is better able to write such a paper than Mr. Wheeler, his modesty is so sensitive that he cannot speak of one inventor of Cayuga County with that freedom that another might. I therefore wish, with your permission, to add a short postscript to Mr. Wheeler's paper, and pay my tribute of respect to his inventive genius and to his industry and perseverance.

Cyrenus Wheeler, Jr., was born March 21st, 1817, in the town of Seekonk, Bristol Co., Mass., about three miles from Providence, R. I. When two years old his father moved to

Fall River, where he engaged in building cotton machinery and manufacturing cotton cloth. At an early age Mr. Wheeler worked in the machine shop and factory, beginning in the lowest and working up to the highest department, and at the age of 17 years was able to perform all the different operations required to convert the raw material into cloth. In 1835 he came with his father to this County, and settled on a farm one mile south of Poplar Ridge, where he lived for 29 years. Mr. Wheeler was a pretty good farmer, but his mind ran to machinery, and I judge from the complete workshops and the number of experimental machines which can now be seen about the farm where he spent those 29 years, that he was more intent in the invention and improvement of agricultural machinery than in hoeing his corn, or weeding his onions; and the Seed planters, Straw cutters, Horse Pitch Forks, and Mowing and Reaping Machines on his own farm testify to a busy life well spent in study and experiment.

He also experimented in his farming operations, and kept careful records of his tests extending through many years. But his most successful inventions were in the line of Mowing and Reaping Machines, and his crops on his farm were largely used and often sacrificed in practical tests of his inventions.

Manufacturers were slow in acknowledging and the farmers slow in applying his inventions, as has been the experience with nearly all inventors; but his industry and perseverance finally triumphed, and his success is attested by the fact that there is scarcely a Mowing or Reaping machine made in the world that does not carry on it some mark of Mr. Wheeler's invention, and I am glad to say that as long as his patents lived those inventions were acknowledged and royalties were paid for their use.

To attain this success, Mr. Wheeler has had to live a very

active life. He has told me that in the year 1863 he traveled in 18 States over 23,000 miles, including 40 trips between Poplar Ridge, where he lived, and Auburn.

It is to such men as Mr. Wheeler, Mr. Kirby, Mr. Burdick and Mr. Obed Hussey, who have devoted their lives to the improvement of machinery, by drawing from the sinews of iron and steel the work which but for them would have to be done by human labor, this country is largely indebted for its progress in the mechanic arts and the immense strides it is making in the development of its resources, and in taking its place, as it surely is, as the first nation of the world, first in resources, first in wealth, first in culture, and first in civilization.

It is the product of the brains of such men that enabled us to feed and maintain our army in the War of the Rebellion; the old men, women and children gathering the harvests, while the young men were fighting the battles. It enables the farmers of Cayuga County to do their own work, and send their sons and daughters to people the boundless prairies of Kansas, Nebraska and Dakota. It enables the almost countless emigrants from the Old World to settle and make homes in our forests. It enables one man to cut and bind twenty acres of grain in a day, instead of two acres, (and this has been done in your life-time, Mr. President.) It enables this country to grow a yearly surplus of two hundred million bushels of grain to send to the hungry people of Europe; and it enables a citizen of Cayuga County to say, that we have in this City (and I say this without egotism, but with the same honest pride which you or any one may say it), the largest manufactory of Harvesting Machinery there is in the world.

When the future writer on the subject of "Inventors and Inventions of Cayuga County," or of the State of New York, shall read his paper before your Society, he will place high

up in the list of names of men who have devoted their lives to invention and to improvements of the age, and who have done their country good and faithful service, the name of Cyrenus Wheeler, Jr.; for his name is inseparably connected with the history of harvesting machinery, and will remain so as long as the ripening grain shall wave over our hills and our valleys, and as long as this Republic remains true to its gratitude for her sons who work for her glory.